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## THE DISTRIBUTION OF PELAGIC POLYCHAETES IN THE SOUTH ATLANTIC OCEAN

*by*

Norman Tebble
British Museum (Natural History)

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# THE DISTRIBUTION OF PELAGIC POLYCHAETES IN THE SOUTH ATLANTIC OCEAN

By Norman Tebble
British Museum (Natural History)

(Text-figs. 1–52)

## INTRODUCTION

THE object of this report is to investigate the distribution of pelagic polychaetes in the South Atlantic Ocean in relation to their environment. It is a contribution to the work on the distribution and dispersal of plankton in the Southern Oceans formerly directed by the Discovery Committee and now continued by the National Institute of Oceanography. As a zoogeographical study it is also intended to be an extension of C. C. A. Monro's (1930, 1936) systematic analyses of the polychaete fauna of the Southern Oceans.

The report is in two main parts: SYSTEMATIC ACCOUNT and ZOOGEOGRAPHY. It is fundamental in a zoogeographical survey to define the units involved—the species—and the Systematic Account forms an integral part of this paper. The principal water masses have been found to influence the distribution of many pelagic polychaetes in the South Atlantic Ocean; the zoogeographical account has been separated therefore into two sections, *Hydrological Environment* and *Distribution of Species*. In the former the characteristics of the water masses are described and in the latter the distribution of species is considered in relation to these. Details of the number of specimens and species collected at each station are tabulated in the tables and appendices.

The treatment of some species from the South Atlantic Ocean is necessarily incomplete, because the distribution of endemic antarctic species and of antarctic and sub-antarctic cosmopolitan populations is more properly a circumpolar study. However in the present state of our knowledge it was felt that a study of the group as a whole was necessary; it is hoped to make circumpolar distribution the subject of a future report.

It has not been possible to examine all the very numerous plankton samples collected by the Discovery Investigations in the South Atlantic Ocean. The material first examined, principally from South Georgia and along the Greenwich Meridian, was sorted by the staff of the N.I.O. and included also the specimens reported by Monro (1930, 1936); subsequently many more hauls were examined in order to extend the work over as wide an area as possible.

The complete development of pelagic polychaetes from the fertilized egg to sexual maturity is unknown, but development is probably direct without metamorphosis. Age groups are almost impossible to define in the present state of our knowledge, and the majority of the specimens described in this report are therefore at indeterminate stages of development.

## ACKNOWLEDGEMENTS

I would like to take this opportunity of thanking Dr N. A. Mackintosh, C.B.E., for permitting me to work on Discovery collections and for advice during the preparation of this report. My thanks are due also to Dr G. R. Deacon, F.R.S. and my colleague, Mr N. B. Marshall for helpful criticism. In addition Miss A. C. Edwards has been very helpful in many ways, particularly in the preparation of charts and hydrological sections.

## MATERIAL AND METHODS

The plankton samples examined for this report are a selection from material collected by the Royal Research ships 'Discovery', 'Discovery II' and 'William Scoresby', between the years 1925 and 1939, on cruises in the Atlantic Ocean from the Ice Edge in 70° S. to just north of the Equator. Selection was necessary because there is a greater concentration, particularly during the summer months, of Discovery stations in the Antarctic region than elsewhere in the Atlantic. It was accordingly decided (1) to examine material from as wide an area as possible, and (2) to use certain lines of stations for this purpose. The positions of the stations from which samples were used are shown in Text-figs. 1–5; the approximate positions of the major surface hydrological boundaries are indicated in Text-figs. 1, 4*a* and *b*. These boundaries fluctuate and are therefore shown nearest to their actual location when the stations were worked.

Station data are given in the text, in tables, charts, hydrological sections and the appendices, but should further information be required the reader is referred to the Discovery Station Lists (*Discovery Reports*, vols. I, III, IV, XXI, XXII, XXIV). Full descriptions of the plankton nets and hydrological methods are given in Kemp, Hardy and Mackintosh (1929) and in the respective Station Lists; the nets used are briefly given below:

(1) N 50: hauled vertically (V) only. With its very fine mesh this net is primarily designed to capture phytoplankton; the NC 50 net (attached to larger nets) was used to a small extent.

(2) N 70: hauled vertically (V), towed obliquely (B) or horizontally (H); designed to capture medium and smaller size macroplankton.

(3) N 100: hauled vertically (V) and towed obliquely (B) or horizontally (H); designed to collect the larger macroplankton.

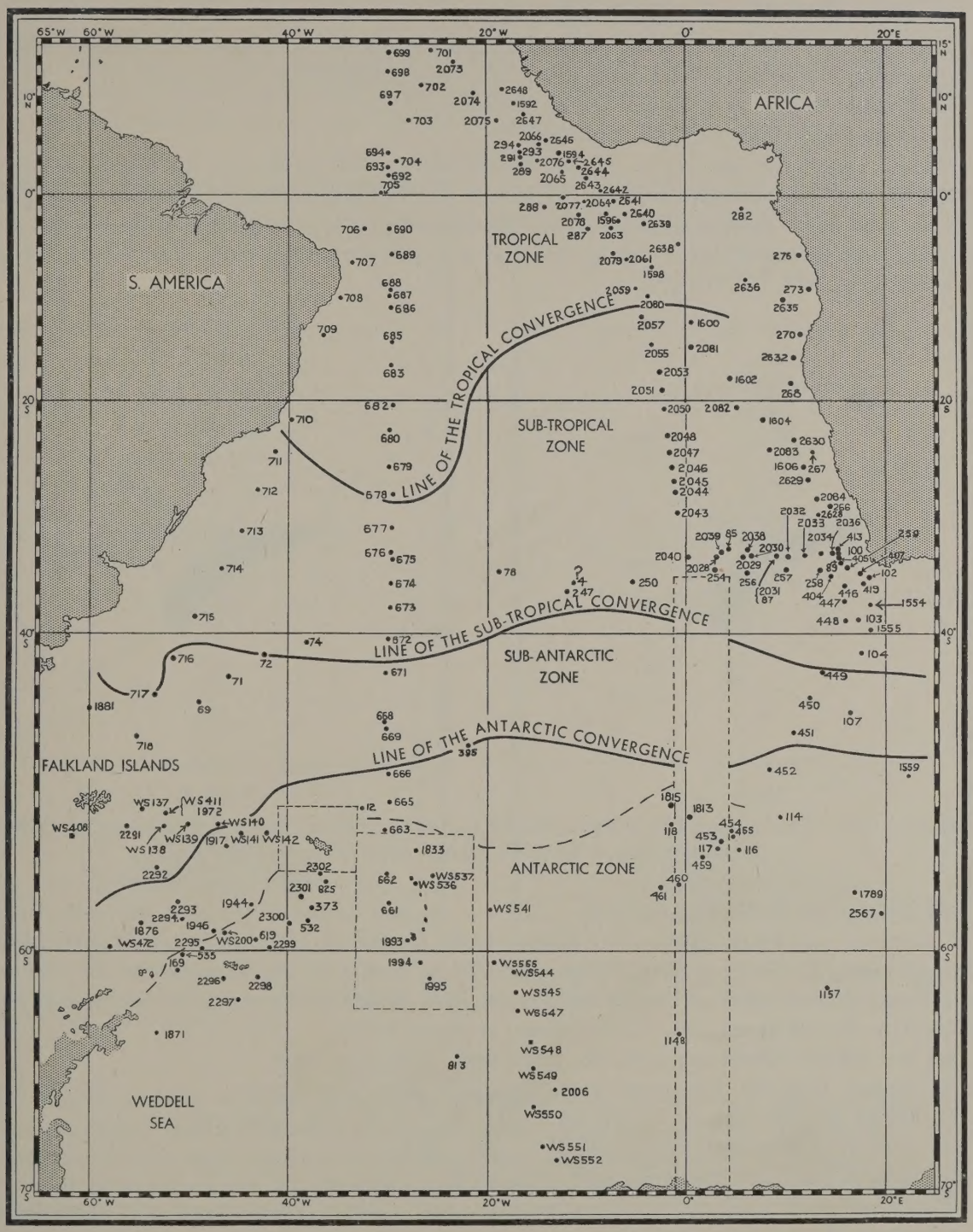
(4) TYF: hauled vertically (V), towed obliquely (B) or horizontally (H); designed to catch macroplankton.

(5) N 450: for macroplankton.

The N 50 and N 70 nets when used vertically were hauled at a constant speed through a known depth range, but the speed and depth of the towed nets were subject to some variation depending on weather conditions and regulation of the speed of the ship. The vertical nets are therefore of greater value for quantitative analysis.

Unless otherwise stated, all station numbers used in this report refer to those made by the Discovery Investigations. When made by 'Discovery' (Sts. 1–299) or 'Discovery II' (Sts. 300–2648), these are not prefixed, but when made by 'William Scoresby', the letters WS precede each; for the South Sandwich Survey the letters SS are used, and for the Marine Biological Station on South Georgia, the letters MS.

Details of areas from which samples have been examined are given here: these are considered either as 'Surveys', where a comparatively small area was made the object of intensive collecting, or as 'Lines' when the ships made collections in set directions.




Text-fig. 1. Chart showing all stations at which specimens were obtained, except round South Georgia, South Sandwich Islands and in the region of the Greenwich Meridian (0° Line). For these see Text-figs. 2, 3, 4*a*, 4*b* and 5.

(1) *The South Georgia Surveys* (Text-figs. 2 and 3).

Collections from two surveys have been examined; closing (N 70 V) nets were used on both, at depths down to 1000 m.; 50–0 m., 100–50 m., 250–100 m., 750–500 m., 1000–750 m.:

(*a*) February to March 1928, Sts. WS 137 to WS 195.[1]

(*b*) January to February 1930, Sts. 300–358.

Material collected at Sts. MS 11, MS 22, MS 25, MS 31, MS 32, MS 34A and MS 62, and most of that reported by Hardy and Gunther (1935) from the Survey of December to January 1926–7 has also been available. Additional samples from the following stations within the South Georgia area have also been examined: Sts. 17, 26, 41, 130, 150, 151, 527, 1079, 1201, 1935, 1936, WS 53, WS 59, WS 60, WS 61, WS 351, WS 372.

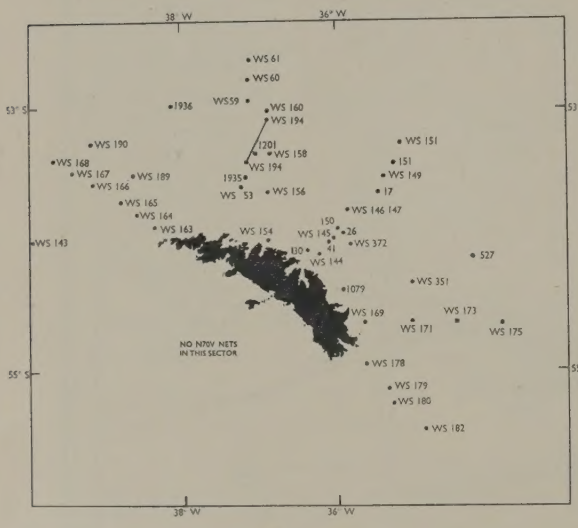



Fig. 2

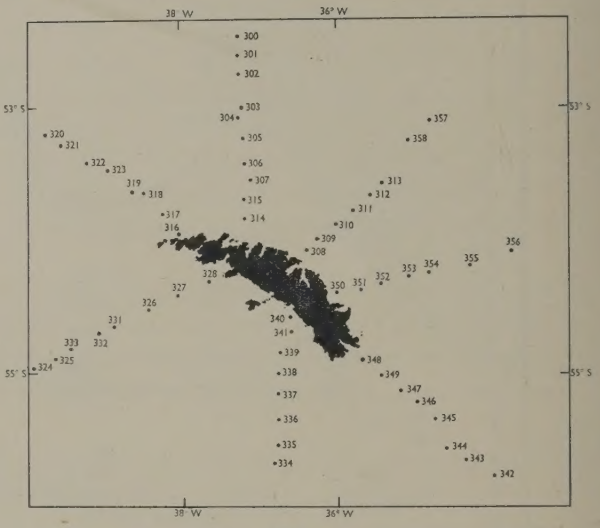



Fig. 3

Text-figs. 2 and 3. South Georgia Surveys. Fig. 2, Sts. WS 144–WS 194, February–March 1928; also some miscellaneous stations in the area; fig. 3, Sts. 300–358, January-February 1930.

(2) *The 0° Line* (Text-figs. 4*a* and *b*).

Collections were made within a few degrees of the Greenwich Meridian in the Antarctic, Sub-Antarctic and Sub-Tropical zones between latitude 70° S. and 36° S. Samples from N 70 V nets were examined from all the following stations (the most southerly station is given first in each case, its position depending generally on the location of the pack-ice).

(*a*) November to December 1938, Sts. 2501, 2498, 2496, 2494, 2492.

(*b*) January 1939, Sts. 2547, 2545, 2543, 2541, 2538, 2535, 2533–2530.

(*c*) March to April 1937, Sts. 2010, 2012, 2014, 2017, 2018, 2020, 2022–2027.

(*d*) April 1938, Sts. 2322, 2320, 2318, 2316, 2313, 2311.

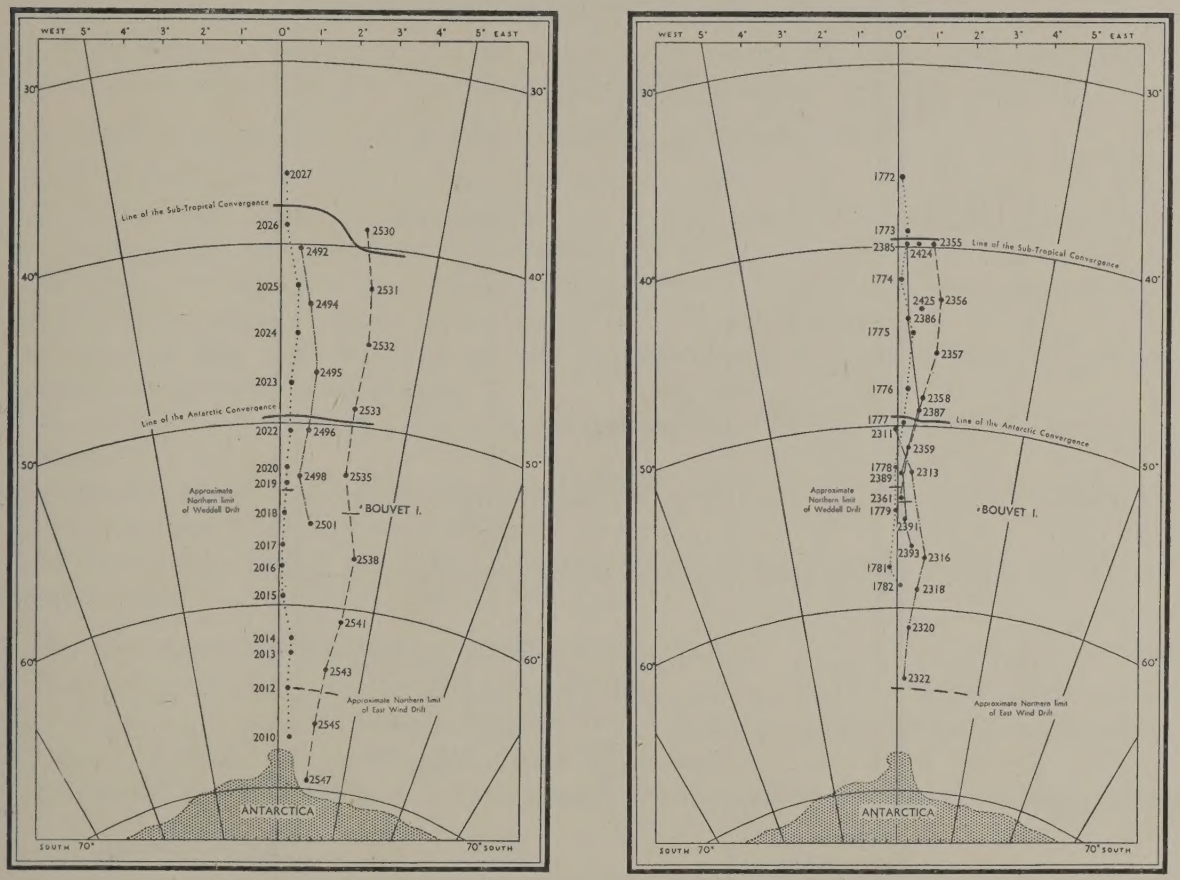
(*e*) May to June 1936, Sts. 1782, 1781, 1779–1772.

The following stations do not form a continuous line, but have been grouped together for convenience:

(*f*) July 1938, Sts. 2361, 2358–2355.
August 1938, Sts. 2392, 2391, 2389, 2387, 2386, 2385.
September 1938, Sts. 2425, 2424.

[1] Sts. WS 137 to WS 142 are actually some distance from South Georgia and are listed here for convenience only.

Normally seven hauls were made at all these stations, from 50–0 m., 100–50 m., 250–100 m., 500–250 m., 750–500 m., 1000–750 m. and 1500–1000 m. Allowance has been made for these varying lengths of haul in the vertical distribution charts for three species collected along the 0° Line. A haul of 250 m. has been taken as the standard, and the number of specimens collected in the 50–0 m. and 100–50 m. hauls multiplied by 5, in the 250–100 m. hauls by 5/3, and in the 1500–1000 m. hauls by $\frac{1}{2}$.




(*a*) (*b*)

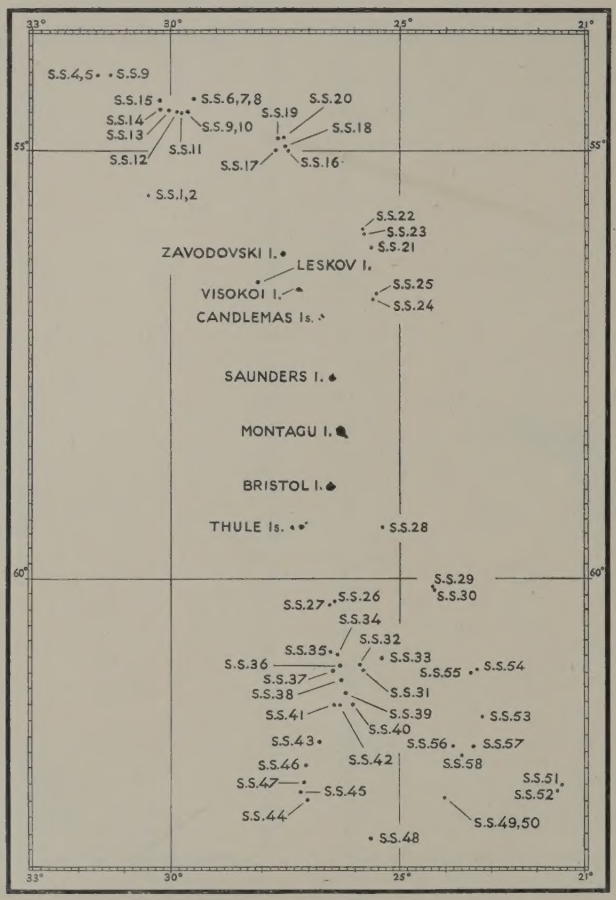
Text-fig. 4. Greenwich Meridian (0° Line). (*a*) Sts. 2010–27, March-April 1937; Sts. 2492–2501, November–December 1938; Sts. 2530–47, January 1939. (*b*) Sts. 1772–82, May–June 1936; Sts. 2311–22, April 1938; Sts. 2355–61, 2385–93, 2424 and 2425, July–September 1938.

Each amended number is plotted in the mean position of depth for each particular haul. The effect is that the plotted numbers represent the relative density of the population per unit volume of water in that part of the column sampled in each haul. The actual numbers of specimens caught by each net are given in Appendix I. The N 70 V samples from the 0° Line collections were taken in three hydrological zones over a distance of approximately 2160 nautical miles and provide quantitative information on the distribution of the smaller polychaetes.

In addition to the above samples material collected by N 100 B or N 70 B nets was examined from the following stations on the 0° Line: 1148, 1772, 2010–2027; 1813, 1815, 2322 (see Appendix II).

(3) *The South Sandwich Survey* (Text-fig. 5).

Collections were made around the South Sandwich Islands from November 1927, to February 1928, at Sts. SS 1–SS 58, with N 50 V, N 70 V, N 70 B and N 100 B nets. No samples were collected below 250 m., so that the results obtained are restricted in value, but they do provide limited confirmation of other more complete data.




Text-fig. 5. South Sandwich Survey. Sts. SS 1–SS 58, November–January 1927–8.

(4) *South Sandwich Islands to the Ice Edge in 68° 53′ S.* (Text-fig. 1).

In January and February 1931, collections were made at Sts. WS 536, WS 537, WS 541, WS 544 to WS 552 and WS 555, of which the N 70 B and N 100 B samples have been studied.

(5) *Falkland Islands to the Ice Edge in the Weddell Sea and to South Georgia* (Text-fig. 1).

In March 1938, collections were made down to 750 m. at twelve stations, 2291–2302, from which samples from N 70 B, N 100 B and N 100 H nets have been examined.

(6) *Cape Town to Bouvet Island* (Text-fig. 1).

In October and November 1926, collections in the Sub-Antarctic and Sub-Tropical zones were made at Sts. 100, 102, 103, 104, 107, 114, 116, 117 and 118, from which the N 70 V samples have been examined. This line of stations was repeated in June and August 1930, Sts. 404, 405, 407, 413, 419, and in October, Sts. 446–61, from which TYFB and N 100 B samples have been examined.

(7) *The 30° Line* (Text-fig. 1).

During March, April and May of 1931 collections were made along the meridian of 30° W., from 57° 36′ S. to 14° 27¼ N., in four hydrological zones, at Sts. 661–99. Catches were made at various depths down to 3000 m. with the TYFB and TYFV nets.

(8) *Falkland Islands to Cape Town* (Text-fig. 1).

In May and June 1926 collections near the Sub-Tropical Convergence were made at Sts. 71, 72, 74, 78, 85, 87 and 89 with the N 70 V and TYF nets. Part of this line, from Tristan da Cunha to Cape Town, was repeated in June 1927 (Sts. 250, 254, 256, 257, 258 and 259), with shallow TYF nets.

(9) *Cape Verde Islands to and from Cape Town* (Text-fig. 1).

Some of these stations extend the lines noted above.

(*a*) July to August 1927: Sts. 266, 267, 268, 270, 273, 276, 282, 287, 288, 289, 291 and 294; only samples from TYF nets, towed near the surface, examined.

(*b*) October to November 1935, Sts. 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606; samples from TYFB nets towed at various depths between 700 m. and the surface.

(*c*) April to May 1937, Sts. 2028–66; samples from N 70 B, N 100 H, TYFB, N 450 B and N 450 H nets towed at various depths.

(*d*) October to November 1937, Sts. 2073–84; samples from TYFB nets towed at the surface and at depth.

(*e*) March to April 1939, Sts. 2627–48; samples from N 50 V and TYFB nets fished through the surface layers and TYFB nets towed at depth.

All these samples provide information on the distribution of species within the Sub-Tropical and Tropical zones.

(10) *Cape Verde Islands to Falkland Islands* (Text-fig. 1).

During October and November 1931 collections were made at Sts. 701–18, from depths varying between 358 and 150 m. to the surface with the TYFB nets used once at each station. This is the only line of stations in the western area of the South Atlantic.

Specimens from the following miscellaneous stations have also been examined (Text-figs. 1 and 2).

(11) *Antarctic Zone.*

Sts. 12, 169, 373, 395, 461, 532, 535, 619, 813, 825, 1148, 1157, 1559, 1789, 1813, 1815, 1833, 1871, 1876, 1917, 1944, 1946, 1993, 1994, 1995, 2006, 2567, WS 200, WS 472.

(12) *Sub-Antarctic Zone.*

Sts. 1881, WS 408, WS 411.

(13) *Sub-Tropical Zone.*

Sts. 4, 1554, 1555.

At the majority of these miscellaneous stations, single specimens of some of the larger species had frequently been picked out of the samples and were preserved separately (Appendix II, Table *j*). In addition some stations are from localities from which Monro (1930, 1936) reported material.

Full use has been made of the Plankton Analysis Sheets prepared by the staff of the N.I.O., when sorting the samples. These sheets summarize all the major phyto- and zooplankton groups collected. As noted in the appendices, the nil-results for complete samples are taken directly from these Analyses except when I did the sorting, for the negative results of which I am responsible. All these negative

results have been considered when discussing the distribution of individual species. The charts showing distribution do not, however, show the negative stations (except Text-figs. 23 and 24 and Tables 14–19) although it is highly desirable to indicate the regions from which a species is absent. The reason for this omission is the difficulty of defining a negative station. Many species are taken mostly, but not exclusively, in certain nets and all nets were not always used at all stations. Moreover the same number of samples was not collected at every station. Thus, although a species may not have been collected at a particular station, this station may not necessarily be a negative one. The species-distribution charts should therefore be compared with the charts for all the stations examined (Text-figs. 1–5); in this way a fair idea is obtained of presence and absence in the area covered.

## SYSTEMATIC ACCOUNT

A considerable literature exists on the systematics of pelagic polychaetes, of which the most comprehensive is the report by Støp-Bowitz (1948) on the 'Michael Sars' North Atlantic Deep-Sea Expedition in which many nomenclatorial problems are clarified. These include the replacing of numerous long-established names by others which have priority but which for various reasons have been overlooked. I have accepted most of the conclusions reached by Støp-Bowitz and reference can be made to his paper for greater detail. Lists of synonyms preceding the descriptions of species have been restricted to works important to distribution in the Atlantic Ocean, and to references of systematic value; the spelling of specific names in these lists follows that used in each particular reference.

The remoteness of the regions in which many pelagic polychaetes occur has resulted in our having little or no knowledge of the living animal. Minute morphological differences therefore have frequently been accepted as specific characters, when they may in fact indicate geographical variants or different stages in life cycles. It is emphasized below that this is particularly true of the Alciopidae.

All specimens recorded for the first time in this report have been deposited in the British Museum (Natural History) Collections (Registered numbers, 1955:6:1:1 to 2849, 1955:6:2:1 to 2291 and 1955:6:3:1 to 2507).

### Family TOMOPTERIDAE

All species in this family are exclusively pelagic in habitat and aberrant in form, never having more than two pairs of chaetigate processes and having over most of the body achaetous parapodia with paddle-shaped pinnules.

Prostomium with a pair of laterally directed antennae, which together form its anterior border, a pair of nuchal organs and normally a pair of eyes. There may be two pairs of lateral chaetigate processes just behind the eyes—of which the anterior and smaller pair is often missing (the first pair of chaetigers), whereas the posterior pair is always present (the second pair of chaetigers). Parapodia are biramous and achaetous with notopodia and neuropodia modified into paddle-shaped pinnules; these pinnules may carry glands of unknown function which have been given the following names: (*a*) chromophil glands; these are large glands which appear only in neuropodia and stain deeply with haematoxylin; (*b*) hyaline glands; very small glands which occur in either notopodia or neuropodia, they may be pigmented or appear only as crystalline spots; they do not stain with haematoxylin; (*c*) rosette glands; very small glands which occur on the trunks of the parapodia or on notopodia and neuropodia; they do not stain with haematoxylin; (*d*) spur glands; these are small, normally subsidiary to the chromophil glands, and occur only on neuropodia; they stain with haematoxylin. The spur gland is so called because it projects from the normally entire surface of the pinnule. Posteriorly the body may be prolonged into a tail bearing rudimentary parapodia. Throughout his work on

Tomopteridae, Støp-Bowitz (1948) used indentation of the aciculae in the second pair of chaetigers as a character of specific importance. In no specimen examined by me have I found support for such use.

Two genera are known in this family, *Enapteris* Rosa, 1908*b* with pinnules which do not border the inner edge of parapodia-rami and *Tomopteris* Eschscholtz, 1825, in which the pinnules surround the rami. No specimens of *Enapteris*, a monospecific genus, have been seen in the plankton samples examined here.

## Genus Tomopteris Eschscholtz, 1825

Notopodial and neuropodial pinnules always completely surrounding the parapodial trunk.

*Type species.* *Tomopteris onisciformis* Eschscholtz, 1825.

*Type locality.* South Seas (Pacific).

It has long been the practice of many, but not all, authors to split this genus into two subgenera, *Tomopteris sensu stricto*, almost always with hyaline glands, always without rosette glands and normally, but not always, without a first pair of chaetigers and a tail, and *Johnstonella* Gosse, 1853, always with rosette glands, normally but not always, without hyaline glands and normally, but not always, with a first pair of chaetigers and a tail. I have always had the greatest difficulty in separating rosettes and highly pigmented hyaline glands, and have retained the former only where it is clearly comparable with common usage. I can, however, see no point in retaining this subgeneric division when it neither separates the genus into natural groups nor represents a practical method of separating groups of species.

Table 1. *In this table the presence (×) or absence (–) of the more important diagnostic characters in the species described below is indicated*

| | | *Hyaline glands* | | | | | *Chromophil glands* | | | *Pinnules extend to body wall* | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *First chaetigers* | *Apical* | *Dorsal* | *On most feet* | *On 3rd and 4th feet only* | *Rosette glands* | *Compact* | *Diffuse* | *With spur* | | *Tail* |
| *T. planktonis* | – | × | – | × | – | – | × | – | – | – | – |
| *T. carpenteri* | – | – | × | × | – | – | × | – | – | – | – |
| *T. septentrionalis* | – | – | × | × | – | – | – | × | – | – | – |
| *T. ligulata* | – | – | × | × | – | – | × | – | – | × | – |
| *T. elegans* | × | – | × | – | × | – | × | – | – | – | – |
| *T. nisseni* | – | × | – | × | – | – | × | – | – | – | × |
| *T. krampi* | × | × | – | × | – | – | × | – | – | – | × |
| *T. kempi* | – | – | – | – | – | × | × | – | – | – | × |
| *T. apsteini* | × | – | – | – | – | × | × | – | × | – | × |

### Tomopteris planktonis Apstein, 1900

*Original localities.* In the Atlantic Ocean between Ascension Island and Brazil, Ascension Island and Cape Verde Islands and between Newfoundland and Iceland.

*Tomopteris planktonis* Apstein, 1900, p. 42, pl. 11, figs. 21, 22, and pl. 12.
*Tomopteris planktonis* Reibisch, 1905, pp. 9–10, figs. 14, 15.
*Tomopteris* (*Tomopteris*) *planktonis* Rosa, 1908*b*, pp. 301–2.
*Tomopteris* (*Tomopteris*) *planktonis* Malaquin and Carin, 1911, pp. 14–15.
*Tomopteris ligulata* Ehlers, 1917, pp. 232–33 (in part).
*Tomopteris* (*Tomopteris*) *planktonis* Malaquin and Carin, 1922, p. 22, p. 27, pp. 39–40; pl. 10, figs. 1, 2 (in part).
*Tomopteris* (*Tomopteris*) *planktonis* Fauvel, 1923, pp. 224–5, fig. 84*d*.
*Tomopteris* (*Tomopteris*) *planktonis* Augener, 1929, pp. 303–4.
*Tomopteris* (*Tomopteris*) *carpenteri* Monro, 1930, pp. 84–6 (in part).
*Tomopteris planktonis* Fauvel, 1932*a*, p. 18.

*Tomopteris* (*Tomopteris*) *planktonis* Caroli, 1933, pp. 378–9.
*Tomopteris* (*Tomopteris*) *cavalli* Monro, 1936, p. 121.
*Tomopteris* (*Tomopteris*) *planktonis* Monro, 1936, p. 121 (in part).
*Tomopteris* (*Tomopteris*) *septentrionalis* Monro, 1936, pp. 121–2 (in part).
*Tomopteris planktonis* Monro, 1937, p. 270.
*Tomopteris* (*Tomopteris*) *planktonis* Terio, 1947, pp. 356–7.
*Tomopteris* (*Tomopteris*) *planktonis* Støp-Bowitz, 1948, pp. 52–4 (in part), fig. 39.
*Tomopteris* (*Tomopteris*) *planktonis* Støp-Bowitz, 1949, pp. 13–16.
*Tomopteris planktonis* Wesenburg-Lund, 1950*b*, pp. 43–4.
*Tomopteris* (*Tomopteris*) *planktonis* Støp-Bowitz, 1951, p. 9.

*Description.* In Table 2 measurements of a selection of specimens from various stations and depths have been listed according to size.

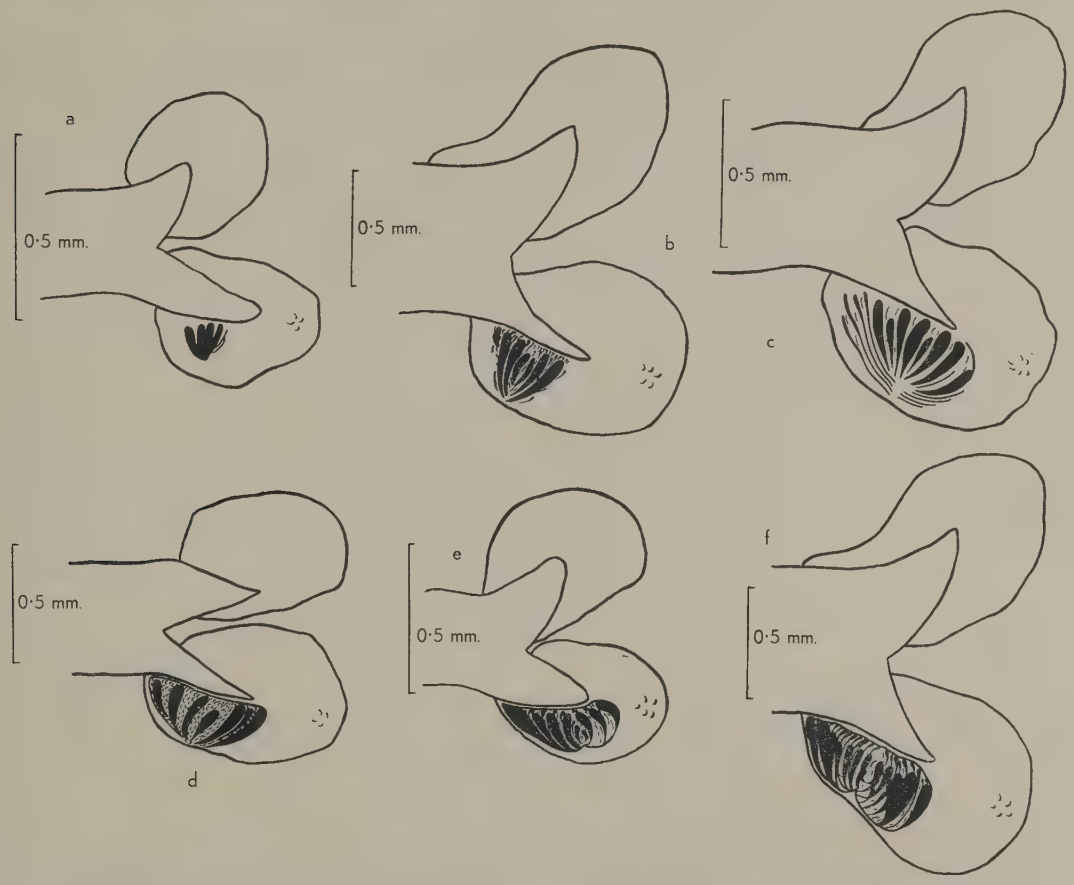
Table 2. *Measurements of* Tomopteris planktonis

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 2024 | N 70 V | 100–50 | 2·0 | 0·5 | 10 |
| 2023 | N 70 V | 500–250 | 2·5 | 1·0 | 13 |
| 2393 | N 70 V | 750–500 | 3·0 | 1·5 | 12 |
| 2084 | TYFB | 240–0 | 3·5 | 2·0 | 14 |
| 2028 | N 70 B | 118–0 | 3·5 | 2·0 | 15 |
| 2034 | N 100 B | 162–0 | 4·0 | 1·5 | 14 |
| 259 | TYF | 450–370 | 5·0 | 2·0 | 15 |
| 2014 | N 70 V | 250–100 | 5·0 | 2·0 | 15 |
| 2027 | N 70 V | 250–100 | 5·0 | 2·0 | 16 |
| 1781 | N 70 V | 750–500 | 5·0 | 2·5 | 16 |
| 1779 | N 70 V | 750–500 | 6·0 | 2·5 | 16 |
| 661 | TYFV | 500–250 | 6·5 | 2·5 | 15 |
| 686 | TYFB | 400–0 | 7·0 | 3·0 | 17 |
| 672 | TYFB | 200–0 | 7·5 | 3·0 | 17 |
| 254 | TYF | 200(–0)* | 8·0 | 3·0 | 15 |
| 674 | TYFB | 280–0 | 9·0 | 3·0 | 17 |
| 2040 | TYFB | 600–0 | 10·5 | 3·0 | 17 |

* When the symbol (–0) is used it means that the net was hauled open to the surface because of failure in the closing mechanism.

The anterior border of the antennae is entire, and there is a pair of prominent eyes on the prostomium. The first pair of chaetigers is never present in this species; the second pair reach normally to about two-thirds the length of the body; occasionally they are longer, but never more than the body length. Hyaline glands appear apically on the neuropodial pinnule of all feet, but they are frequently indistinct. The chromophil glands appear first on the inferior border of the neuropodial pinnules of the fourth parapodia, and vary slightly in position and development according to the size of the specimen. In the smallest, and almost certainly youngest forms (Text-fig. 6*a*), the gland is not fully developed, but consists of a group of small tubules some distance away from the junction of the corner of the pinnule with the parapodial trunk. In the largest and more mature specimens, the gland consists of numerous tubules and projects right into this corner (Text-fig. 6*f*). Stages between these two extremes are shown in Text-figs. 6*b–e* but the glands are not always developed to the same extent on all feet in the same specimen. In a specimen from St. 1776 the gland on the fourth foot was developed as in Text-fig. 6*a*, but on the seventh was similar to that illustrated in Text-fig. 6*e*. From St. 254 there are a number of specimens with fully-developed chromophil glands on the fourth to seventh feet but with no development of the gland from the eighth foot up to the end of the body. A tail is never present in this species.

*Discussion.* In Apstein's original description of *T. planktonis* he particularly noted the absence of a first pair of chaetigers but some later authors (Malaquin and Carin, 1922, and Støp-Bowitz, 1948) have noticed their presence in supposedly young forms. From Apstein's illustration it is clear that his specimen, 5 mm. long for thirteen pairs of parapodia, was not fully developed, the chromophil gland being some distance from the pinnule. It is in fact of that size and stage of development in which one would expect a first pair of chaetigers to be present, if they are present at all. In the present




Text-fig. 6. *Tomopteris planktonis*: parapodia of specimens from (*a*) St. 1782, (*b*) St. 254, (*c*) St. 2316, (*d*) St. 2393, (*e*) St. 1776, (*f*) St. 254.

survey, even in the smallest specimens, 2 mm. long for ten pairs of parapodia, there is no sign of a first pair of chaetigers, and I must conclude that the particular specimens to which Malaquin and Carin (1922) and Støp-Bowitz (1948) referred are not *T. planktonis*; it is possible that they were dealing with young specimens of *T. elegans* (see pp. 179–180).

In the course of this work I have re-examined the following material:

(*a*) Monro, 1930, p. 87, as *T. cavalli*, from 'Discovery', St. 89, 1000–0 m. Monro reported four specimens, three of which are present in the B.M.(N.H.), (Reg. no. 1930, 10.8.848–850) all of them in a state of bad preservation; two have a first pair of chaetigers, the larger, 15 mm. long for twenty-three parapodia, has a tail, and the other, 11 mm. long for twenty-one parapodia has hyaline glands. Neither of these can be *T. cavalli*, which was first described by Rosa (1907) without hyaline glands, or a tail, or a first pair of chaetigers. I think they are *T. krampi* Wesenburg-Lund (1936) (see below,

pp. 181–182). The third specimen, 9 mm. long for twenty parapodia, is too macerated to allow of specific determination.

(*b*) Monro, 1936, p. 121, as *T. cavalli* from 'Discovery', St. 451, 170–0 m. Monro reported five specimens, nine are present in the B.M.(N.H.), (Reg. no. 1936.2.8.1000–6). All these specimens are small, between 3 and 6 mm. long for twelve to sixteen pairs of parapodia, and have apical hyaline glands on neuropodial pinnules. Not even in the smallest, 3 mm. long for twelve parapodia, is there a first pair of chaetigers. I consider all these specimens are *T. planktonis*.

One of the original localities from which specimens of *T. cavalli* were first described was in the South Atlantic, off Buenos Aires Province (Rosa, 1907) and I had expected to find it in the present survey. It is, however, very close to *T. planktonis*, differing only in being without hyaline glands, and in having a mid-ventral chromophil gland. This latter character has been shown (p. 172) to be characteristic of development of *T. planktonis* and of specimens of *T. planktonis* which also have fully developed chromophil glands on other feet (Text-fig. 6, p. 173). Moreover all species of *Tomopteris* normally possessing hyaline glands have a proportion of them pigmented, but occasionally specimens occur with some of these glands on a few parapodia lacking pigment and therefore are difficult to see. In *T. planktonis* the hyaline glands are often unpigmented and staining of the pinnule is necessary to show up the glands. A negative characteristic of this kind can be very confusing and I doubt whether *T. cavalli* is a valid species.

(*c*) In re-examining Monro's (1936) material of *T. septentrionalis* from 'Discovery', St. 41A (B.M.(N.H.), Reg. no. 1936.2.8.1038) I find it to be *T. planktonis*.

*General distribution.* *T. planktonis* has been widely reported from the Atlantic at all explored depths: it is circumpolar in Antarctic waters and almost certainly cosmopolitan (see pp. 228–231).

### Tomopteris carpenteri Quatrefages, 1865

*Type locality.* The Southern Ocean; 60° 3′ S., 0° 6′ E.

*Tomopteris carpenteri* Quatrefages, 1865, pp. 227–9, pl. 20, figs. 1, 2.
*Tomopteris carpenteri* Ehlers, 1917, pp. 229–31, pl. 12, figs. 9–12 (in part).
*nec Tomopteris carpenteri* McIntosh, 1925, pp. 29–32.
*Tomopteris carpenteri* Augener, 1929, pp. 304–7.
*Tomopteris carpenteri* Benham, 1929, pp. 191–5, pl. 11, figs. 18–23.
*Tomopteris* (*Tomopteris*) *carpenteri* Monro, 1930, pp. 84–6 (in part).
*Tomopteris carpenteri* Hardy and Gunther, 1935, p. 115.
*Tomopteris* (*Tomopteris*) *Carpenteri* Støp-Bowitz, 1949, pp. 16–17, figs. 6–7.
*Tomopteris* (*Tomopteris*) *Carpenteri*, Støp-Bowitz, 1951, p. 9.
*Tomopteris carpenteri*, Fauvel, 1953*b*, pp. 4–5.

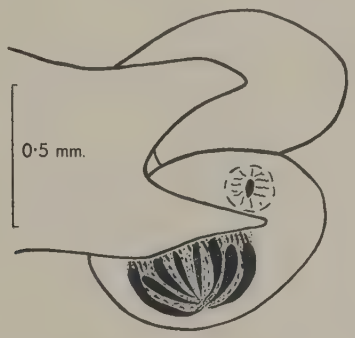
*Description.* This is the largest of all known Tomopteridae, measuring up to 90 mm. long by 18 mm. wide for thirty-five pairs of parapodia; normally, however, it is about 55 mm. long by 15 mm. wide for thirty-three pairs. In the present survey a larger number of young specimens of this species have been examined and the measurements for a number of these are listed according to size in Table 3. Within the size ranges of these juvenile specimens confusion can arise when separating *T. carpenteri* from *T. planktonis*.

The anterior border of the antennae is entire. In young forms the eyes are always visible on the dorsal surface of the prostomium, but are much less distinct in the adult. A first pair of chaetigers is never present; the second pair may reach back to three-quarters of the length of the body. The hyaline gland is deeply pigmented and first appears in both young and adult specimens on the third neuropodial pinnule, dorsal to the parapodial trunk; it is always conspicuous and is present on each

foot up to the end of the body. Chromophil glands appear on the neuropodial pinnule, ventral to the parapodial trunk on all feet from the fourth backwards (Text-fig. 7). They are much bigger in the adult than in the young forms but apart from size there is no structural difference. There is no tail in this species.

Table 3. *Measurements of* Tomopteris carpenteri (*juveniles*)

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 353 | N 70 V | 250–100 | 3·5 | 1·0 | 13 |
| WS 146 | N 70 V | 500–250 | 4·0 | 1·0 | 13 |
| 301 | N 70 V | 500–250 | 4·0 | 1·5 | 13 |
| 355 | N 70 V | 500–100 | 4·0 | 1·5 | 14 |
| WS 137 | N 70 V | 100–50 | 4·0 | 1·5 | 14 |
| MS 25 | NC 50 H | 10 | 5·0 | 2·5 | 17 |
| WS 143 | N 70 V | 750–470 | 5·0 | 2·0 | 16 |
| MS 22 | NC 50 V | 40–0 | 6·0 | 2·5 | 18 |
| WS 141 | N 70 V | 750–500 | 8·0 | 3·0 | 17 |
| MS 11 | NC 50 H | 9 | 9·0 | 3·0 | 18 |
| WS 143 | N 70 V | 750–470 | 10·0 | 4·5 | 18 |




Text-fig. 7. *Tomopteris carpenteri*: parapodium of specimen from St. MS 11.

*Discussion.* In his Discovery report of 1930, Monro suggested that *T. planktonis* was probably the young form of *T. carpenteri*, but Augener (1929) had clearly demonstrated that this is not correct. Large numbers of young forms of *T. carpenteri* from the South Georgia surveys in the present material of the same size range as *T. planktonis* (compare the tables on p. 172 and p. 175) support Augener's conclusion. In *T. planktonis* the hyaline gland is normally unpigmented and apical on the neuropodium, whereas in *T. carpenteri* it is dorsal and always distinctly pigmented even in the very smallest specimens (compare Text-fig. 6, p. 173 and Text-fig. 7). Monro was able to see a copy of Augener's work before his report was published and he added a note to the effect that, if *T. carpenteri* and *T. planktonis* are separate species, his material from Sts. MS 11, MS 19, MS 22, MS 25, MS 31, MS 32, MS 34A, MS 62 and SS 21 would be *T. planktonis*. I have re-examined all these, except the specimen from St. MS 19 which is not in the B.M.(N.H.) collections, and find that in fact they are all young *T. carpenteri*, except the specimen from SS 21 which is *T. planktonis*. Monro noted also that all these are coastal stations (actually SS 21 is not), the suggestion being that the specimens might represent an inshore breeding species. This note will be discussed later (pp. 224–228), but it can be stated here that in the present work the smallest specimens of *T. carpenteri* have been found only in the neighbourhood of South Georgia.

In 1925 McIntosh reported *T. carpenteri* from off the Cape of Good Hope, 33° 46′ 00 S., 17° 13′ 00 E. It is unfortunate that this specimen is not available for examination, but it is described with a tail, with frilled margins to the pinnules, and is figured with a deep indentation in the anterior border of the antennae: it is clearly *T. nisseni* (see pp. 180–181).

*General distribution.* *T. carpenteri* is known only from the Antarctic Zone where the adult has been recorded from all explored depths; the smallest specimens of this species were found only around South Georgia (see pp. 224–228).

### Tomopteris septentrionalis Quatrefages, 1865

*Type locality.* '...les mers du Danemark.'

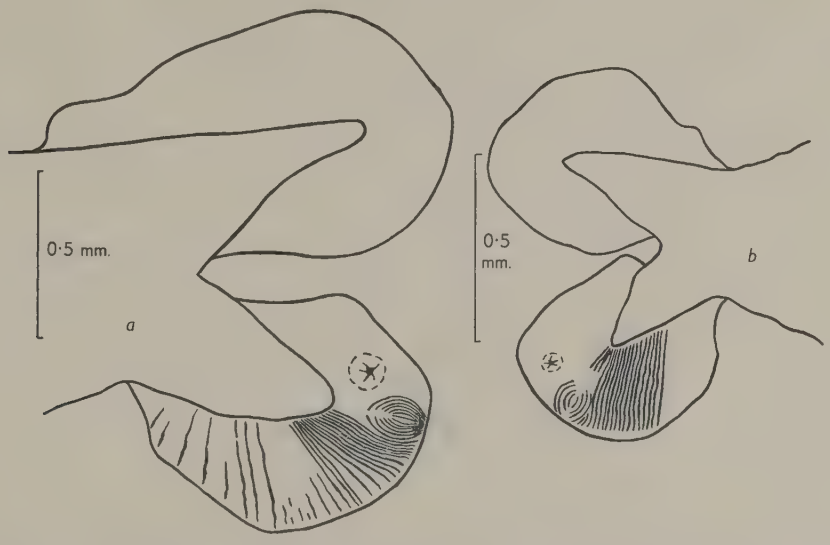
*Tomopteris septentrionalis* Steenstrup, 1849, p. iv (*nomen nudum*).
*Tomopteris septentrionalis* Quatrefages, 1865, p. 229.
*Tomopteris Eschscholtzii* Greeff, 1879*a*, pp. 276–7, pl. 15, figs. 42, 48, 51.
*Tomopteris septentrionalis* Levinsen, 1883, p. 245.
*Tomopteris Eschscholtzii* Apstein, 1900, p. 42.
*Tomopteris septentrionalis* Apstein, 1900, pp. 41–2, pl. 11, figs. 16–17.
*Tomopteris septentrionalis* Reibisch, 1905, p. 9, fig. 13.
*Tomopteris* (*Tomopteris*) *septentrionalis* Rosa, 1908*b*, pp. 297–301, pl. 12, fig. 17.
*Tomopteris* (*Johnstonella*) *septentrionalis* Gravier, 1911*b*, pp. 72–3.
*Tomopteris septentrionalis* Southern, 1911, pp. 20–8.
*Tomopteris septentrionalis* Ehlers, 1917, p. 229.
*Tomopteris septentrionalis* Saemundson, 1918, pp. 191–2.
*Tomopteris* (*Tomopteris*) *septentrionalis* Fauvel, 1923, p. 224, fig. 84*d*.
*Tomopteris septentrionalis* McIntosh, 1925, pp. 24–6, pl. 5, fig. 3, pl. 1, fig. 6.
*Tomopteris septentrionalis* Wesenburg-Lund, 1928, pp. 137–8.
*Tomopteris* (*Tomopteris*) *septentrionalis* Augener, 1929, pp. 301–2.
*Tomopteris* (*Tomopteris*) *septentrionalis* Monro, 1930, pp. 86–7.
*Tomopteris septentrionalis* Fauvel, 1932*a*, p. 18.
*Tomopteris septentrionalis* Hardy and Gunther, 1935, p. 115.
*Tomopteris septentrionalis* Wesenburg-Lund, 1935, pp. 9–12, text-fig. 2, pl. 1, figs. 7, 8, 9.
*Tomopteris* (*Tomopteris*) *septentrionalis* Monro, 1936, pp. 121–2 (in part).
*Tomopteris septentrionalis* Wesenburg-Lund, 1936, pp. 4–7, fig. 6.
*Tomopteris septentrionalis* Monro, 1939*b*, p. 108.
*Tomopteris* (*Tomopteris*) *septentrionalis* Støp-Bowitz, 1948, pp. 49–51, figs. 36–7.
*Tomopteris* (*Tomopteris*) *septentrionalis* Støp-Bowitz, 1949, pp. 12–13.

*Description.* In Table 4 the measurements of a selection of specimens from various stations and depths have been listed according to size.

Table 4. *Measurements of* Tomopteris septentrionalis

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 2543 | N 70 V | 50–0 | 4·0 | 1·5 | 14 |
| 2638 | TYFB | 150–0 | 5·5 | 2·0 | 14 |
| 2080 | TYFB | 400–0 | 6·0 | 2·0 | 16 |
| 266 | TYF | 200–0 | 6·0 | 2·5 | 15 |
| 2020 | N 70 V | 1000–1500 | 8·0 | 3·0 | 16 |
| 661 | TYFV | 500–250 | 8·0 | 2·5 | 18 |
| 2630 | TYFB | 1050–550 | 8·5 | 3·0 | 20 |
| 266 | TYF | 200–0 | 9·0 | 3·0 | 21 |
| SS 24 | N 100 B | 81–0 | 9·0 | 3·5 | 19 |
| 1555 | TYFB | 1000–0 | 10·0 | 4·0 | 19 |
| 671 | TYFB | 360–0 | 11·0 | 3·0 | 21 |
| 514 | N 100 B | 155–0 | 11·0 | 3·5 | 19 |
| 2083 | TYFB | 330–0 | 12·0 | 4·0 | 20 |
| 1606 | TYFB | 190–0 | 12·5 | 3·5 | 21 |
| 100 | TYF | 475–0 | 12·5 | 4·0 | 21 |
| SS 24 | N 70 B | 81–0 | 14·0 | 3·5 | 19 |
| SS 35 | N 100 B | 119–0 | 15·0 | 4·0 | 19 |

The anterior border of the antennae has a prominent central indentation and there is a pair of eyes on the prostomium. The first pair of chaetigers is never present; the second pair reach to about three-quarters the length of the body. Hyaline glands may appear on the first parapodia in the dorsal part of the neuropodial pinnule (Text-fig. 8), but are always present from the third foot up to the end of the body; they are frequently pigmented but may be difficult to see. The chromophil glands appear first on the neuropodia of the third pair of parapodia and subsequently on all feet; they are not compact but consist of a series of ramifying tubules which are situated between the ventral and apical surfaces (Text-fig. 8). A tail is never present.




Text-fig. 8. *Tomopteris septentrionalis*: parapodia of specimens from (*a*) St. 250, (*b*) St. 2017.

*Discussion.* The diffuse chromophil gland in *T. septentrionalis* might cause it to be confused with both *T. planktonis* and *T. elegans*. *T. planktonis* however has a compact chromophil gland in the adult and it is only in young specimens that any similarity between the two exists; as noted above (p. 174) Monro's (1936) specimen of *T. septentrionalis* from St. 41 A, is *T. planktonis*. The presence of the first pair of chaetigers in *T. elegans* serves to separate it from *T. septentrionalis*.

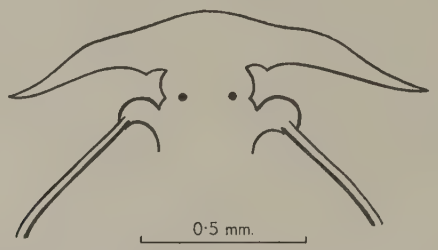
*General distribution.* Cosmopolitan at all explored depths (see pp. 228–231).

### Tomopteris ligulata Rosa, 1908

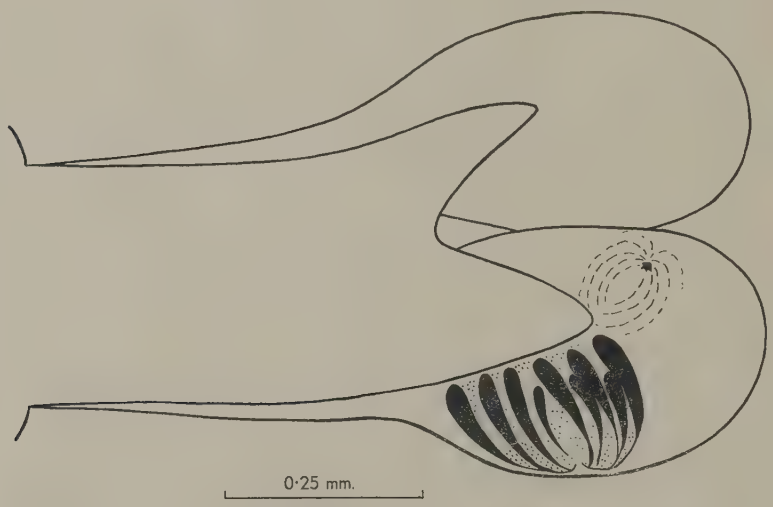
*Original localities.* Atlantic Ocean, 22° N., 35° W., 33° S., 30° W., Pacific Ocean, 31° S., 84° W.

*Tomopteris ligulata* Rosa, 1908*a*, p. 1.
*Tomopteris* (*Tomopteris*) *ligulata* Rosa, 1908*b*, pp. 302–4, pl. 12, figs. 18, 19.
*Tomopteris* (*Tomopteris*) *ligulata* Malaquin and Carin, 1911, pp. 15–16.
*Tomopteris ligulata* Ehlers, 1917, pp. 232–3 (in part).
*Tomopteris ligulata* Malaquin and Carin, 1922, p. 22, p. 28, pp. 41–2, pl. 6, fig. 3, pl. 10, figs. 3–5.
*Tomopteris* (*Tomopteris*) *ligulata* Fauvel, 1923, p. 224, fig. 84*e*.
*Tomopteris* (*Tomopteris*) *ligulata* Caroli, 1928*a*, pp. 4–5.
*Tomopteris* (*Tomopteris*) *ligulata* Caroli, 1928*b*, pp. 7–8, fig. 3.
*Tomopteris* (*Tomopteris*) *ligulata* Caroli, 1933, p. 379.
*Tomopteris planktonis* Monro, 1936, p. 121 (in part).
*Tomopteris ligulata* Monro, 1939*a*, p. 348.
*Tomopteris* (*Tomopteris*) *ligulata* Støp-Bowitz, 1948, p. 52, fig. 38.

*Description.* Fifteen specimens of this species have been examined, of which the largest measures 10·5 mm. long for twenty-two pairs of parapodia and the smallest 4 mm. long for sixteen pairs: the others vary between these limits. The anterior border of the antennae is entire and there is a pair of prominent eyes on the prostomium (Text-fig. 9). There is no first pair of chaetigers; the second pair reach to about two-thirds of the length of the body. The hyaline gland is normally distinct (Text-fig. 10) and appears in a dorsal position from the third neuropodial pinnule to the end of the body and the chromophil gland appears ventrally from the fourth neuropodial pinnule. The pinnules border




Text-fig. 9. *Tomopteris ligulata*: prostomium and 2nd pair of chaetigers of specimen from St. 2028.




Text-fig. 10. *Tomopteris ligulata*: parapodium of specimen from St. 2028.

the parapodia almost to the junction with the body wall (Text-fig. 10): this is a characteristic of the species. In preservative the pinnules frequently become bent concavely backwards, possibly because of the torsion exerted by their long line of contact with the parapodia. There is no tail.

*Discussion.* Through the courtesy of Professor Stresemann and Dr Hartwich, I have been able to examine two specimens of *T. ligulata* Rosa, identified by Ehlers, and described by him in the Deutsche Süd-Polar Expedition's report, 1917, pp. 232–3. The specimens are from the Zoology Museum, University of Berlin (Kat. no. 5857), locality, 63° 42′ S., 82° 0′ E., collected 17. iii. 1903. One specimen is very fragile, 4–5 mm. long, with seventeen pairs of parapodia, with the pinnules not continued close to the body wall, but rounded and typical of the *T. planktonis* condition shown in Text-fig. 6*a–f*, p. 173; the chromophil glands are ventral and the hyaline glands indistinct. The second specimen, not so fragile as the first, is 4–5 mm. long with sixteen pairs of parapodia. Again

the parapodial pinnules are not continued close to the body wall and are similar in shape to those of *T. planktonis*; the chromophil gland is ventral and the hyaline gland indistinct. In neither of the specimens is there a first pair of chaetigers; I consider both of them to be *T. planktonis*. On re-examination of the four specimens reported by Monro (1936) from 'Discovery', St. 714 as *T. planktonis*, I find that three of them (B.M.(N.H.) Reg. no. 1936.2.8.1010–1012) are *T. ligulata*.

*General distribution.* *T. ligulata* has been frequently recorded from the Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see p. 248).

### Tomopteris elegans Chun, 1887

*Type locality.* Canary Islands, 500–1300 m.

*Tomopteris elegans* Chun, 1887, pp. 18–19, pl. 3, figs. 4–9.
*Tomopteris Kefersteinii* Apstein, 1900, p. 41, pl. 11, fig. 15 (*nec T. Kefersteinii* Greeff).
*Tomopteris* (*Tomopteris*) *elegans* Rosa, 1908*b*, pp. 294–7, pl. 12, fig. 16.
*Tomopteris elegans* Ehlers, 1917, p. 227.
*Tomopteris* (*Tomopteris*) *elegans* Malaquin and Carin, 1922, pp. 37–8, pl. 5, figs. 1–6, pl. 8, figs. 3–5, pl. 9, figs. 1–3.
*Tomopteris* (*Tomopteris*) *elegans* Fauvel, 1923, p. 223, figs. 84*b*, *c*.
*Tomopteris elegans* Benham, 1929, pp. 196–7, pl. 2, figs. 24–6.
*Tomopteris* (*Tomopteris*) *elegans* Terio, 1947, pp. 353–4, fig. 18.
*Tomopteris* (*Tomopteris*) *elegans* Støp-Bowitz, 1948, pp. 46–8, fig. 33*a–b*.

*Description.* Twenty-six specimens of this species have been examined, and in Table 5 measurements of nine of them are listed as typical of their size range.

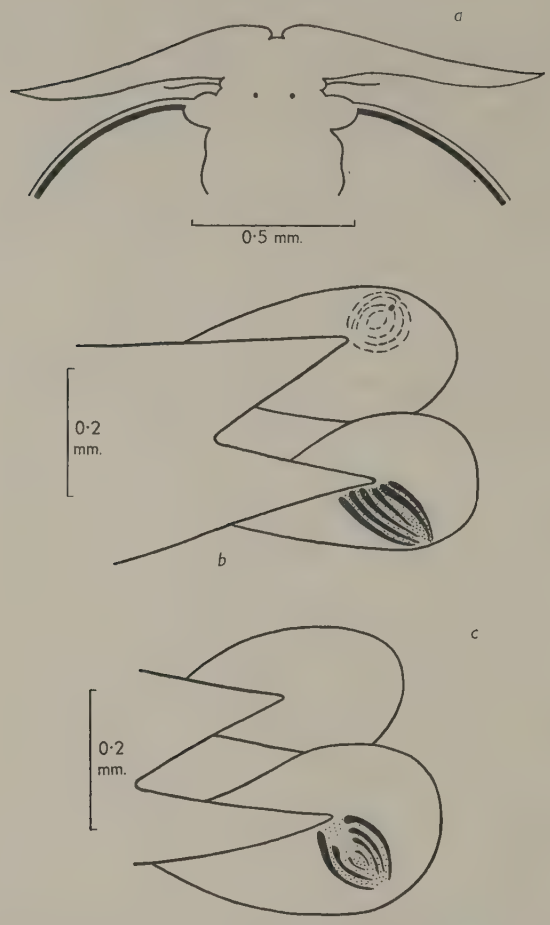
Table 5. *Measurements of* Tomopteris elegans

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 2632 | TYFB | 1800–0 | 4·0 | 1·5 | 14 |
| 2030 | N 70 B | 250–0 | 4·5 | 2·0 | 15 |
| 2028 | TYFB | 118–0 | 5·0 | 2·5 | 13 |
| 2040 | TYFB | 600–0 | 5·0 | 2·0 | 14 |
| 690 | TYFB | 1500–0 | 5·0 | 2·0 | 14 |
| 2028 | TYFB | 118–0 | 5·5 | 2·5 | 14 |
| 2040 | TYFB | 600–0 | 6·5 | 3·0 | 14 |
| | | | 6·5 | 3·0 | 14 |
| 2079 | TYFB | 250–0 | 7·0 | 2·5 | 15 |

The anterior border of the antennae has a pronounced central indentation (Text-fig. 11*a*). A pair of eyes is present, frequently indistinct in small specimens. The first pair of chaetigers is always present (Text-fig. 11*a*) and the second pair reach to two-thirds the length of the body. Pigmented hyaline glands are present on the notopodial pinnules of the third and fourth feet only (Text-fig. 11*b*), elsewhere they are absent. Chromophil glands appear from the fourth neuropodial pinnule on all feet up to the end of the body; they are ventral in position just below the apex of the parapodial trunk (Text-fig. 11*c*). There is no tail.

*Discussion.* It is possible that in some very young specimens of *T. elegans* the hyaline glands are not pigmented; such specimens could have been confused with *T. planktonis* and have given rise to the idea that *T. planktonis* has a first pair of chaetigers.

*General distribution.* *T. elegans* is widely distributed in the warmer waters of all seas: it has its southern limit of distribution in the Atlantic Ocean at the Sub-Tropical Convergence (see pp. 250–252).




Text-fig. 11. *Tomopteris elegans*: (*a*) prostomium and 1st and 2nd pair of chaetigers of specimen from St. 2028, (*b*) 4th parapodium of specimen from St. 2028, (*c*) 5th parapodium of specimen from St. 2632.

## Tomopteris nisseni Rosa, 1908

*Type locality*. Atlantic Ocean, 20° S., 27° W.

*Tomopteris Nisseni* Rosa, 1908*a*, p. 1.
*Tomopteris* (*Tomopteris*) *Nisseni* Rosa, 1908*b*, pp. 292–4.
*Tomopteris* (*Tomopteris*) *Nisseni* Malaquin and Carin, 1911, pp. 11–12.
*Tomopteris Nisseni* Southern, 1911, pp. 17–20, pl. 1, figs. 1–2.
*Tomopteris Nisseni* Malaquin and Carin, 1922, pl. 4, figs. 1–4, pl. 8, figs. 1–2.
*Tomopteris* (*Tomopteris*) *Nisseni* Fauvel, 1923, p. 222, fig. 83*e*, *g*.
*Tomopteris carpenteri* McIntosh, 1925, pp. 29–31.
*Tomopteris nisseni* McIntosh, 1925, pp. 26–7.
*Tomopteris* (*Tomopteris*) *nisseni* Monro, 1930, pp. 87–8.
*Tomopteris Nisseni* Fauvel, 1932*a*, pp. 17–18.
*Tomopteris nisseni* Wesenburg-Lund, 1935, pp. 6–9, figs. 13–15.
*Tomopteris* (*Tomopteris*) *Nisseni* Terio, 1947, pp. 351–3, figs. 16–17.
*Tomopteris* (*Tomopteris*) *Nisseni* Støp-Bowitz, 1948, pp. 44–6, figs. 29–30.
*Tomopteris nisseni* Wesenburg-Lund, 1950*b*, p. 42.
*Tomopteris nisseni* Wesenburg-Lund, 1951, pp. 32–3.

*Description.* This is a large species which may measure up to 60 mm. long in the adult, but it appears to be very difficult to catch and preserve in good condition, so that for the majority of specimens it is not possible to give accurate measurements or parapodial counts. Among the largest specimens is one from St. 1555, measuring 49 mm. in length by 11 mm. wide for twenty-five parapodia with another four rudimentary feet on the broken tail. At St. 2646 one of the smaller specimens occurred, measuring 7·5 mm. long by 3 mm. wide for nineteen parapodia. There is a deep indentation in the middle of the anterior border of the antennae, and two prominent eyes are set close together on the prostomium. The first pair of chaetigers is missing; the second pair is very long and in the smaller specimens may be four or five times as long as the body, but in the adult it is normally only twice the body length. Parapodial pinnules are reduced to a fringe bordering the feet. Apical hyaline glands normally appear first on the neuropodial pinnules of the third parapodia and on the notopodia of the eighth feet, and on all subsequent rami to the end of the body. They are frequently indistinct and in the smaller specimens are difficult to see. Prominent chromophil glands appear first in the ventral part of the fourth neuropodial pinnule in the adult, and are present on all parapodia up to the pygidium. In the small specimens, the chromophil gland may not appear until the tenth foot or later. The notopodial hyaline gland seems to vary a great deal in position, Rosa (1908*b*) reporting it from the third, Fauvel (1923) from the eighth or ninth, Wesenburg-Lund (1935) from the fifth and Støp-Bowitz (1948) from the fourth pair of parapodia: in the specimens examined here it does not vary to this extent, but in small specimens it is frequently so indistinct that it cannot be seen on some anterior feet. A prominent tail is present with rudimentary parapodia, but it is almost always incomplete.

*Discussion.* As noted on page 175 the *T. carpenteri* described by McIntosh (1925) from off South Africa is almost certainly *T. nisseni*. The relationship of *T. nisseni* to other species is discussed on page 182.

*General distribution.* *T. nisseni* is widely reported from the Atlantic Ocean in which its southern distribution is limited by the Sub-Tropical Convergence (see pp. 246–248).

### Tomopteris krampi Wesenburg-Lund, 1936

*Type locality.* North Atlantic Ocean, 36° 19′ N., 26° 50′ W.

*Tomopteris* (*Tomopteris*) *cavallii* Monro, 1930, p. 87 (in part ?).
*Tomopteris Krampi* Wesenburg-Lund, 1936, pp. 8–11, figs. 1–3.
*Tomopteris* (*Tomopteris*) *Krampi* Støp-Bowitz, 1948, pp. 48–9, fig. 34.

*Description.* The measurements of all specimens of this species examined in the present survey are listed in Table 6, except Monro's 1930 material from 'Discovery', St. 89, which are on p. 173.

Table 6. *Measurements of* Tomopteris krampi

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 2081 | TYFB | 950–500 | 9·0 | 3·0 | 22 |
| *2083 | TYFB | 330–0 | 13·0 | 4·0 | 21 |
| 256 | TYF | 1100–800(–0) | 19·0 | 5·0 | 22 |
| | | | 19·0 | 5·5 | 23 |
| *1604 | TYFB | 620–500 | 19·0 | 5·0 | 22 |
| 673 | TYFV | 1000–750 | 21·0 | 7·0 | 23 |
| *1606 | TYFB | 600–300 | 26·0 | 9·0 | 22 |

Specimens indicated by an asterisk have a tail and this is included in the measurement of length. The anterior border of the first pair of chaetigers is entire with a slight fold in the central portion; there is a pair of eyes on the prostomium. The first pair of chaetigers is present and the second pair

extend a little beyond the body length. Hyaline glands appear on all notopodial and neuropodial pinnules from the third feet. They are distinct in most specimens and apical in position near the apex of the parapodial rami. Chromophil glands occur ventrally on the neuropodial pinnule of all feet from the third backwards, except in the specimen from St. 2081 where they appear first on the fourth foot. A tail is normally present but is frequently broken off.

*Discussion.* As noted on p. 173, I think it possible that two of the specimens reported by Monro (1930) as *T. cavallii* are *T. krampi.* Most of the Discovery material examined here is larger than the original specimens recorded by Wesenburg-Lund (1936), who gave a size range of 10–15 mm. in length by 4–5 mm. wide, or by Støp-Bowitz (1948) who reported one of the larger of his specimens as 10 mm. long by 4 mm. wide. Both these authors noted that the chromophil gland began on the fourth foot, whereas in my material this is the case in only the smallest specimen. It is probable that as development proceeds, the chromophil gland appears on the third foot. Both Wesenburg-Lund (1936) and Støp-Bowitz (1948) regarded *T. krampi* as closely related to *T. elegans*, but I think it is much closer to *T. nisseni* or *T. kempi*. *T. nisseni* is normally much bigger than *krampi*, but apart from size differs only in lacking a first pair of chaetigers and in the arrangement of the hyaline glands; *T. kempi* also differs in being without a first pair of chaetigers, but has rosette glands instead of hyaline glands (p. 183). The size range of Monro's smaller specimens of *T. kempi* (p. 182) covers that found here for *T. krampi*, otherwise I would have suggested that the material above represents the young stages of *T. kempi* which possibly lose the first pair of chaetigers on becoming adult.

*General distribution.* Known only from the Atlantic, off south-west Iceland, Southern Greenland (Wesenburg-Lund, 1936) between the Canaries and the Azores and between Newfoundland and Ireland (Støp-Bowitz, 1948) *T. krampi* is reported here for the first time from the South Atlantic, probably having the southern limit of its distribution at the Sub-Tropical Convergence (see p. 250).

### Tomopteris kempi Monro, 1930

*Type locality.* 'Discovery', St. 4, off Tristan da Cunha, 36° 55′ 00″ S., 12° 12′ 00″ W., 0–10 m. B.M.(N.H.) Reg. no. 1930.10.8.3076–3080, 7 specimens.

*Tomopteris* (*Johnstonella*) *kempi* Monro, 1930, pp. 88–9, fig. 27.

*Description.* Measurements of all seven specimens reported by Monro are listed in Table 7.

Table 7. *Measurements of* Tomopteris kempi

| *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia up to tail* | *No. of rudimentary parapodia on tail* |
|---|---|---|---|
| 9 | 3·0 | 14 | 3 |
| 12 | 4·0 | 15 | 2 |
| 13 | 4·0 | 15 | 1 |
| 18 | 6·0 | 15 | 3 |
| 38 | 10·0 | 16 | 2 |
| 55 | 12·0 | 16 | 4 |
| 55 | 20·0 | 16 | 3 |

There is a small indentation in the middle of the antennae and a pair of indistinct eyes on the prostomium. The first pair of chaetigers is missing; the second pair about two-thirds the body length in the larger specimens, but in the small ones the chaetigers are a third as long again. On the third parapodia and all subsequent feet there is a black spot on the notopodial and neuropodial pinnules,

where they meet the apex of the parapodial trunks. These black spots Monro called rosette glands. From the third foot backwards, there is a ventral chromophil gland in the neuropodia. There is a prominent tail carrying rudimentary feet.

*Discussion.* The black spot described by Monro as a rosette gland bears no resemblance to described rosettes, nor does it have any of the fine tubules normally associated with hyaline glands. It is probably advisable to separate it from the hyaline organ, but to call it a rosette over-emphasizes the difference, and tends to hide the close relationship of *T. kempi* to *T. nisseni* and *T. krampi*.

### Tomopteris apsteini Rosa, 1908

*Type locality.* Messina, Mediterranean Sea.

*Tomopteris* (*Tomopteris*) *Apsteini* Rosa, 1908*b*, pp. 288–92, pl. 13, figs. 10–13.
*Tomopteris rosaea* Ehlers, 1917, pp. 224–7, pl. 11, figs. 2–8.
*Tomopteris* (*Johnstonella*) *apsteini* Malaquin and Carin, 1922, pp. 31–4, pl. 2, figs. 1–4; pl. 3, figs. 1–7, pl. 7, figs. 1–3.
*Tomopteris* (*Johnstonella*) *Apsteini* Fauvel, 1923, pp. 220–1, fig. 83*a–d*.
*Tomopteris* (*Johnstonella*) *Apsteini* Støp-Bowitz, 1948, pp. 39–42, figs. 26–7.

*Description.* In Table 8 measurements for ten of the twenty-five specimens examined have been listed, including the smallest and largest.

Table 8. *Measurements of* Tomopteris apsteini

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 679 | TYFV | 250–0 | 8 | 3·5 | 22 |
| 679 | TYFB | 300–0 | 9 | 2·5 | 21 |
| 676 | TYFB | 290–0 | 10 | 3·0 | 22 |
| 682 | TYFB | 375–0 | 13 | 4·0 | 21 |
| 678 | TYFB | 360–0 | 15 | 4·5 | 21 |
| 1555 | TYFB | 1000–0 | 18 | 7·5 | 19 |
| 2083 | TYFB | 330–0 | 20 | 7·0 | 19 |
| 247 | TYF | 115–100(–0) | 22 | 6·0 | 19 |
| 674 | TYFB | 280–0 | 43 | 13·0 | 30 |
| 677 | TYFV | 2000–0 | 47 | 10·0 | 30 |

There is a small indentation in the middle of the anterior border of the antennae. A pair of eyes is present on the prostomium but the eyes are rarely distinct. The first pair of chaetigers is small, the second pair extend to about two-thirds the length of the body. One rosette is present near the ventral surface of the parapodia of each of the first two feet; thereafter one is present on all notopodial and neuropodial pinnules where they meet the apex of the parapodial trunk. The characteristic 'spur' glands of the species may appear on the first neuropodia, projecting prominently from the ventral border of the pinnules; they are always present from the second feet onwards and from the third are associated with the large chromophil glands. In the larger specimens, both spur and chromophil glands are so close together that they appear as one, with the spur represented as an outgrowth breaking the ventral surface of the pinnule. A prominent tail is always present and with it are normally associated rudimentary parapodia.

*General distribution. T. apsteini* has its southern limit of distribution in the Atlantic Ocean at the Sub-Tropical Convergence (see p. 252).

## Family ALCIOPIDAE

Exclusively pelagic. Body elongate with numerous segments; exceptionally short and wide. Prostomium small with two very large eyes, and normally with five antennae. Three or five pairs of tentacular cirri. Proboscis eversible, sometimes with two long anterior cirriform appendages, always with papillae, rarely with chitinous teeth. Parapodia uniramous with dorsal and ventral cirri, pedal lobe, simple and/or compound chaetae, and normally with pigmented segmental glands. In the female, anterior dorsal cirri may be modified into seminal pouches. Anal cirri present.

### Genus NAIADES Delle Chiaje, 1830

Body elongate with the prostomium carrying five antennae. There are three pairs of tentacular cirri and the first three pairs of parapodia are reduced. Proboscis bell-shaped with two short anterior cirriform lobes, between which are small papillae. Parapodia with simple chaetae only; the pedal lobe is without an appendage.

*Type species.* *Naiades cantrainii* Delle Chiaje, 1830.

*Type locality.* Naples.

Støp-Bowitz (1948) has demonstrated the necessity for replacing the long accepted generic name *Alciopa* with *Naiades*.

#### Naiades cantrainii Delle Chiaje, 1830

*Naiades cantrainii* Delle Chiaje, 1830, pl. 82, figs. 14, 18, 21.
*Alciopa Reynaudi* Krohn, 1845, pp. 172–3, pl. vi, figs. 1–6, *nec* Aud. and M. Edwards.
*Alciopa Edwardsii* Krohn, 1847, pp. 39–40.
*Alciope Edwardsii* Grube, 1850, p. 305.
*Krohnia Edwardsii* Quatrefages, 1865, p. 158.
*Alciopa Edwardsii* Ehlers, 1868, p. 176.
*Alciopa Cantrainii* Claparède, 1870, pp. 469–71, pl. 10, fig. 2.
*Alciopa Cantrainii* Greeff, 1876, pp. 57–60.
*Alciope cantrainii* Viguier, 1886, p. 404.
*Alciope microcephala* Viguier, 1886, pp. 404–5, pl. 26, figs. 1–5.
*Alciopa cantrainii* Apstein, 1891, p. 128.
*Alciopa Cantrainii* Apstein, 1900, p. 7, pl. 5, fig. 53.
*Alciope cantrainii* Ehlers, 1913, p. 464.
*Alciope Cantrainii* Fauvel, 1916, pp. 64–5.
*Alciopa Cantrainii* Fauvel, 1923, pp. 203–4, fig. 76.
*Alciopa cantrainii* Monro, 1930, p. 84.
*Alciopa cantrainii* Monro, 1936, p. 115.
*Alciopa cantrainii* Wesenburg-Lund, 1939, pp. 25–8, fig. 19.
*Naiades Cantrainii* Støp-Bowitz, 1948, pp. 24–5, figs. 15–16.

*Description.* This species may measure up to 110 mm. in length by 8 mm. wide across the tips of chaetae, but complete specimens are not common. The body is sharply terminated anteriorly with the eyes projecting prominently forward with the small prostomium between them. There are two pairs of small anterior antennae and one small unpaired median antenna on the dorsal surface between the eyes. The first pair of tentacular cirri are long, the remaining two very small. The first three pairs of parapodia are much reduced with small lobes and no chaetae but with aciculae; in the female the dorsal and ventral cirri of the second pair are modified as seminal pouches. Subsequent parapodia up to the end of the body each have a large foliaceous dorsal cirrus, a smaller ventral cirrus, a prominent projecting acicula, long simple chaetae and a strongly pigmented dorsal segmental gland.

*General distribution.* *N. cantrainii* is widely reported from the South Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see p. 257).

## Genus Vanadis Claparède, 1870

Body elongate. Prostomium with two pairs of small antennae on the anterior border and one single, dorsal, and posterior to these. There are three to five pairs of tentacular cirri. Parapodia with long compound chaetae and pedal lobe with terminal appendage. Proboscis sometimes with two long cirriform appendages and always with small terminal papillae.

*Type species*. *Vanadis formosa* Claparède, 1870.

*Type locality*. Gulf of Naples.

### Vanadis formosa Claparède, 1870

*Vanadis formosa* Claparède, 1870, pp. 480–4, pl. 10, fig. 3.
*Vanadis pelagica* Greeff, 1876, p. 67, pl. 3, figs. 33–4.
*Alciopa longirhyncha* Greeff, 1885, pp. 453–5, pl. 14, fig. 37.
*Alciopa Krohnii* Hering, 1892, p. 738, pl. 4, figs. 1–13.
*Vanadis formosa* Apstein, 1900, pp. 8–10, pl. 1, fig. 1–6.
*Vanadis formosa* Lo Bianco, 1904, p. 50, pl. 29, fig. 113.
*Vanadis formosa* Southern, 1911, pp. 2–3.
*Vanadis formosa* Fauvel, 1916, pp. 65–6.
*Vanadis formosa* McIntosh, 1922, p. 13.
*Vanadis formosa* Fauvel, 1923, pp. 205–6, fig. 77*a–c*.
*Vanadis formosa* McIntosh, 1923, pp. 440–1.
*Vanadis formosa* Monro, 1930, p. 81 (in part).
*Vanadis formosa* Fauvel, 1932*a*, pp. 16–17.
*Vanadis formosa* Augener, 1934, pp. 217–19.
*Vanadis formosa* Monro, 1936, p. 116.
*Vanadis formosa* Monro, 1937, p. 268.
*Vanadis formosa* Monro, 1939*a*, p. 348.
*Vanadis formosa* Wesenburg-Lund, 1939, pp. 28–32, figs. 20–21, chart 15.
*Vanadis formosa* Støp-Bowitz, 1948, pp. 25–6, fig. 17, chart 18.
*Vanadis formosa* Støp-Bowitz, 1951, p. 7.

*Description*. This species may measure up to 300 mm. in length by 4–5 mm. wide across the bases of parapodia and 12 mm. across the tips of chaetae, but complete specimens are rare. The two pairs of anterior antennae are digitiform: the single antenna is between the large eyes. The proboscis has two long terminal processes, each carrying a pair of basal ailerons. These ailerons are continuous with dorsal and ventral circlets of papillae; there are six papillae in each of the dorsal and ventral groups and they form a coronet terminal on the proboscis. There are three pairs of tentacular cirri on each of successive segments behind the prostomium, of which the first pair are the longest and are joined to each other by a large basal ceratophore across the ventral surface behind the prostomium. The first two pairs of parapodia are reduced or modified in the mature female, the dorsal cirri becoming voluminous seminal pouches. In the male there is no modification of anterior parapodia but the first two pairs are reduced. In both sexes from the third foot onwards, parapodia are well developed with large foliaceous dorsal and smaller ventral cirri; each foot has a pedal mamelon with a projecting acicula, a cirriform appendage and compound chaetae with short terminal articles. Darkly pigmented segmental glands appear on each foot after the first three, except in the mature females when they appear on the first two modified parapodia. In some specimens which have no seminal pouches on anterior feet, there are well-developed white ventral glands appearing at the twenty-fifth parapodia and continuing up to the end of the body. Støp-Bowitz (1948) has associated this gland with the male.

*Discussion.* In re-examining Monro's (1930) material of *V. formosa* I find the specimens from 'Discovery' Sts. 85 and 287 are *V. crystallina* (below) and those from Sts. 270 and 282 are *V. longissima* (p. 187).

*General distribution.* *V. formosa* is widely reported from the South Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see pp. 252–255).

### Vanadis crystallina Greeff, 1876

*Type locality.* Gulf of Naples.

*Vanadis crystallina* Greeff, 1876, pp. 68–9, pl. 4, figs. 35–9.
*Alciopa candida* Hering, 1892, p. 732, pl. 3.
*Vanadis crystallina* Apstein, 1900, pp. 10–11, pl. 1, fig. 7.
*Vanadis cristallina* Lo Bianco, 1904, p. 50, fig. 112.
*Vanadis crystallina* Granata, 1911, p. 56.
*Vanadis crystallina* Ehlers, 1913, p. 466.
*Vanadis crystallina* Fauvel, 1916, p. 66.
*Vanadis crystallina* Fauvel, 1923, pp. 206–7, fig. 77*d*, *e*.
*Vanadis augeneri* Benham, 1929, pp. 187–8, pl. 1, figs. 1–7.
*Vanadis formosa* Monro, 1930, p. 81 (in part).
*Vanadis crystallina* Fauvel, 1932*a*, p. 17.
*Vanadis Augeneri* Fauvel, 1935, pp. 295–6.
*Vanadis crystallina* Monro, 1936, pp. 116–17.
*Vanadis formosa* Monro, 1937, p. 268.
*Vanadis crystallina* Wesenburg-Lund, 1939, pp. 32–4, fig. 22, chart 16.
*Vanadis Augeneri* Fauvel, 1951, p. 292.
*Vanadis crystallina* Støp-Bowitz, 1951, p. 7.

*Description.* *V. crystallina* may measure up to 145 mm. in length by 0·6 mm. wide across the parapodial bases and 3·0 mm. wide across the tips of chaetae, but complete specimens are rare. The antennae are small and conical. The proboscis carries two long terminal processes with two pairs of basal ailerons continuous with dorsal and ventral circlets of four to six papillae. Three pairs of tentacular cirri are present on successive segments behind the prostomium, of which the first are the longest and are joined ventrally by basal ceratophores. The first seven to ten pairs of parapodia are rudimentary; they have no chaetae and only very small parapodial cirri of which the dorsal are the largest and tend to be ovate. In the mature female the first and second of these parapodia have dorsal cirri modified as voluminous seminal pouches; well-developed parapodia appear after the first seven to ten feet, each with a broadly foliaceous dorsal cirrus, a smaller ventral foliaceous cirrus and a long pedal lobe with projecting acicula, cirriform appendage and long compound chaetae with short terminal articles. There is some variation in the position of the pigmented segmental glands on the body. In all mature females and in most other specimens they begin at the fourth foot and continue up to the end of the body, but in a number of specimens they appear first between the seventh and twelfth foot. There appears to be no pattern in this variation, specimens from the same station showing both conditions, and it is probably due to the strength of the pigment in particular glands surviving preservation.

*Discussion.* Most modern authors describe this species with four pairs of tentacular cirri, although Hering (1892, as *Alciopa candida*) clearly demonstrated that it has only three. Fauvel (1935) first drew attention to this possibility of error, in describing *Vanadis augeneri* Benham, from Annam, and this has been substantiated in recent studies (Støp-Bowitz, 1948). I have re-examined the type specimens of *V. augeneri* (Benham 1929, (B.M.(N.H.), Reg. no. 1929.9.20.1) from 'Terra Nova', Sts. 123–213 and they are identical with the above description of *V. crystallina*. Neither of them are mature females.

Monro (1930) reported specimens from 'Discovery', Sts. 85 and 287 as *V. formosa* (B.M.(N.H.),

Reg. no. 1930.10.8.907/958), apparently because the two anterior dorsal cirri of each are modified as seminal pouches; in all respects, however, the specimens are identical with *V. crystallina* and I refer them to this species. Similarly I consider Monro's (1937) specimen of *V. formosa*, from 'John Murray', St. 131D (not 13D as printed) (B.M.(N.H.), Reg. no. 1937.9.2.91) to be *V. crystallina*. The specimen from St. 100 (p. 254) has a bifurcate median antenna.

The descriptions of *V. formosa* and *V. crystallina* indicate how closely related they are, and because they both occupy the same zoogeographical areas it is possible that they represent stages in the complex life cycle of a single species. This, of course, can only be elucidated through observation of the living animals.

*General distribution.* *V. crystallina* is widely reported from the South Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see pp. 252–255).

### Vanadis longissima (Levinsen), 1885

*Type locality.* 26° 0′ N., 26° 0′ W.

*Rhynchonerella longissima* Levinsen, 1885, pp. 330–1, figs. 7–10.
*Vanadis longissima* Fauvel, 1916, pp. 66–7.
*Vanadis longissima* Fauvel, 1923, p. 207, fig. 77*f–g*.
*Vanadis longissima* Monro, 1930, pp. 79–91, fig. 24*a–c*.
*Vanadis formosa* Monro, 1930, p. 81 (in part).
*Vanadis antarctica* Monro, 1930, p. 116 (in part).

*Description.* No complete specimens of this species have been examined but the longest piece is 80 mm. in length by 9 mm. wide across the tips of chaetae. The dorsal unpaired antenna lies immediately behind the paired anterior group. The proboscis is terminated by twelve separate small papillae. There are three pairs of conical tentacular cirri, all of equal length, of which the first are joined ventrally. The first pair of parapodia are achaetous and have small but broadly foliaceous dorsal cirri; ventral cirri are minute. In the mature female the dorsal cirri of the second and third parapodia are converted into very large, darkly pigmented, seminal pouches, ventral cirri are small and conical; between the two cirri a single compound chaeta projects. The pigment on the seminal pouches appears to originate from the pigmented segmental glands on the second and third feet. From the fourth foot parapodia have foliaceous dorsal cirri, conical pedal and ventral cirri and long compound chaetae; all parapodia gradually increase in size to a constant width at about the eleventh foot. On specimens other than mature females the second and third feet are poorly developed with small foliaceous dorsal cirri and short ventral cirri. The occurrence of the pigmented segmental glands does not follow a particular pattern; this is indicated in Table 9 where the position of the glands up to the forty-third feet has been tabulated from four specimens with more than one hundred chaetigers. After the forty-third parapodia the glands appear at intervals of one, two or three feet up the end of the body. Although no complete specimens have been examined, all the material listed has at least one hundred pairs of parapodia. Normally the pigment is confined to the gland or the dorsal surface of the gland-bearing segment but it may also cover the dorsal and ventral surfaces giving a striped appearance to the specimens.

*Discussion.* I have re-examined Monro's (1930) specimens of *V. formosa* from 'Discovery', Sts. 270 and 282 (B.M.(N.H.), Reg. no. 1930.10.8.942/904) and his 1936 material of *V. antarctica* from 'William Scoresby', Sts. WS 408, WS 411 (B.M.(N.H.), Reg. no. 1936.2.8.866/867) and consider them to be *V. longissima*.

*General distribution.* *V. longissima* has been widely reported from the Atlantic Ocean where it probably has its southern limit of distribution at the Antarctic Convergence (see p. 224).

Table 9. *Variation in the position of pigmented segmental glands in* Vanadis longissima (× *indicates the gland is present; L.=left-hand side, R.=right-hand side*)

| *Parapodia no.* | *St. WS* 411 ♀ | | *St.* 680 | | *St.* 1972 | | *St.* 2291 | |
|---|---|---|---|---|---|---|---|---|
| | *L.* | *R.* | *L.* | *R.* | *L.* | *R.* | *L.* | *R.* |
| 1 | . | . | . | . | . | . | . | . |
| 2 | × | × | . | . | × | × | × | × |
| 3 | × | × | . | . | × | × | × | × |
| 4 | × | × | × | × | × | × | × | × |
| 5 | × | × | × | × | × | × | × | × |
| 6 | × | × | × | × | . | . | × | × |
| 7 | × | × | . | . | × | × | × | × |
| 8 | × | × | . | . | × | × | × | × |
| 9 | × | × | . | . | × | × | × | × |
| 10 | . | . | × | × | . | . | × | × |
| 11 | . | . | × | × | . | . | . | . |
| 12 | . | . | . | . | . | . | . | . |
| 13 | × | × | . | . | × | × | × | × |
| 14 | × | × | . | . | × | × | × | × |
| 15 | × | × | . | . | × | × | × | × |
| 16 | . | . | × | × | . | . | . | . |
| 17 | . | . | . | . | × | × | . | . |
| 18 | . | . | . | . | . | . | . | . |
| 19 | × | × | . | . | . | . | × | × |
| 20 | × | × | × | × | × | × | . | × |
| 21 | × | × | × | × | . | . | . | . |
| 22 | . | . | . | . | . | × | . | . |
| 23 | . | . | . | . | . | . | . | . |
| 24 | . | . | . | . | . | . | × | × |
| 25 | × | × | × | × | × | × | . | . |
| 26 | × | × | . | . | . | . | . | . |
| 27 | . | . | . | . | . | . | . | . |
| 28 | . | . | × | × | × | × | × | × |
| 29 | . | . | × | × | . | . | . | . |
| 30 | × | × | . | . | × | × | × | . |
| 31 | . | . | . | . | . | . | . | . |
| 32 | . | . | . | . | × | × | × | × |
| 33 | . | . | × | × | × | × | . | . |
| 34 | . | . | . | . | . | . | . | × |
| 35 | × | × | . | . | × | × | × | × |
| 36 | . | . | . | . | . | . | × | . |
| 37 | . | . | × | × | . | . | . | . |
| 38 | . | . | × | × | × | × | × | × |
| 39 | . | . | . | . | . | . | × | . |
| 40 | × | × | . | . | . | . | × | . |
| 41 | . | . | . | . | . | . | × | . |
| 42 | . | . | . | . | × | × | . | × |
| 43 | × | × | × | . | . | . | . | . |

## Vanadis antarctica (McIntosh), 1885

*Type locality*. At the surface of the Southern Ocean between 'Challenger', Sts. 154, 64° 37′ S., 85° 49′ E., and 155, 64° 18′ S., 94° 47′ E.

*Alciopa antarctica* McIntosh, 1885, pp. 175–6, pl. 28, figs. 2–4, pl. 32, fig. 12.
*Vanadis antarctica* Apstein, 1900, p. 11.
*Vanadis antarctica* Willey, 1902, pp. 271–3, pl. 44, fig. 8, pl. 46, figs. 1 and 2.
*Alciopa antarctica* Gravier, 1911*b*, pp. 65–70, pl. 2, fig. 26, pl. 3, figs. 28–9, pl. 4, fig. 38.
*Vanadis antarctica* Ehlers, 1913, p. 466 (in part).

*Vanadis antarctica* Benham, 1921, pp. 58–61, pl. 8, figs. 61–2.
*Vanadis antarctica* Augener, 1932, pp. 27–8.
*Vanadis antarctica* Fauvel, 1936*a*, pp. 17–18.
*Vanadis antarctica* Monro, 1936, p. 116 (in part).
*Vanadis antarctica* Støp-Bowitz, 1948, p. 30.
*Vanadis antarctica* Støp-Bowitz, 1949, pp. 5–9.
*Vanadis antarctica* Støp-Bowitz, 1951, p. 7.
*Vanadis antarctica* Baker, 1954, pp. 208–17.

*Description.* One of the only two complete specimens of this species examined measures 230 mm. long for 5 mm. wide across the bases of parapodia, and 15 mm. wide across the tips of chaetae. The two pairs of anterior antennae are ovate; the single posterior antenna, between the large eyes, is digitiform. A circlet of twelve separate papillae terminates the proboscis; the papillae are normally equal in length, but sometimes a few of them are slightly longer than the others. There are three pairs of long, slender tentacular cirri on each of successive segments behind the prostomium, of which the first are joined ventrally by basal ceratophores. The first pair of parapodia have prominent foliaceous cirri (which have frequently been mistaken for a fourth pair of tentacular cirri) and tiny ventral cirri, which are always difficult to see. In the female, the dorsal cirri of the next two parapodia are modified as seminal pouches. Subsequently, there is a group of from seven to ten parapodia, which are small though fully developed, each with a pedal lobe and appendage, compound chaetae and dorsal and ventral cirri. Thereafter the parapodia are much larger with the pedal lobes very much longer than the foliaceous cirri and with exceedingly long chaetae. Segmental glands are strongly pigmented, and in the region of the first group of small parapodia (and sometimes including the most anterior of the larger parapodia) the pigment extends over the dorsal surface of the body. This gives the species the appearance of having a pigmented neck and although the degree of pigmentation varies from light to heavy it is always present. The occurrence of the pigmented segmental glands in four specimens is given in Table 10. Although the glands are always present anteriorly they may be absent in the middle body-region, but beyond a certain point on the body, varying between the twenty-third and fiftieth parapodia, the glands are present on every segment, in contrast to *V. longissima* where beyond the fiftieth segment glands are still missing from some chaetigers.

*Discussion.* I have examined the type specimen in the B.M.(N.H.) (Reg. no. 1885.12.1.131A), of *Alciopa antarctica* McIntosh, 1885. Unfortunately this specimen is without its head, and efforts to find it, including inquiries at the University of St Andrews, where McIntosh did his work, have been unsuccessful. However the anterior seminal pouches of the left-hand side are present and indicate the specimen is female. As noted on page 187 the specimens reported by Monro (1936) from Sts. WS 408 and 411 as *V. antarctica* are *V. longissima*.

The descriptions of *V. antarctica* and *V. longissima* show the close relation of these two species, and the possibility of their being geographical races of one species is discussed on page 224.

*General distribution. V. antarctica* is confined to the Antarctic Zone (see p. 224).

### Vanadis violacea Apstein, 1893

*Type locality.* Unknown.

*Vanadis violacea* Apstein, 1893, p. 143.
*Vanadis violacea* Monro, 1936, p. 117.

Monro reported two specimens of this species, one each from 'Discovery', Sts. 413 and 419 (B.M.(N.H.), Reg. no. 1936.2.8.900/901), but neither specimen permits of an adequate description of the species, which may represent another race of the *V. longissima-V. antarctica* complex.

Table 10. *Variation in the position of the pigmented segmental glands in* Vanadis antarctica (× *indicates the gland is present; L.=left-hand side, R.=right-hand side*)

| *Parapodia no.* | *Type* ♀ | | *St.* 1789 | | *St.* 2006 | | *St.* 2012 ♀ | |
|---|---|---|---|---|---|---|---|---|
| | *L.* | *R.* | *L.* | *R.* | *L.* | *R.* | *L.* | *R.* |
| 1 | . | * | . | . | . | . | . | . |
| 2 | × | * | × | × | × | × | × | × |
| 3 | × | * | × | × | × | × | × | × |
| 4 | × | * | × | × | × | × | . | . |
| 5 | × | × | × | × | × | × | × | × |
| 6 | × | × | × | × | × | × | × | × |
| 7 | × | × | × | × | × | × | × | × |
| 8 | × | × | × | × | × | × | × | × |
| 9 | × | × | × | × | × | × | × | × |
| 10 | . | . | . | . | . | . | . | . |
| 11 | . | . | . | × | . | . | . | . |
| 12 | . | . | × | . | . | . | . | . |
| 13 | × | × | × | × | × | × | . | . |
| 14 | × | × | × | × | × | × | × | . |
| 15 | × | × | × | × | × | × | × | × |
| 16 | . | × | . | . | . | . | × | . |
| 17 | . | . | . | × | . | . | . | . |
| 18 | × | × | . | . | . | . | . | . |
| 19 | × | × | × | . | × | × | × | . |
| 20 | × | . | × | × | × | × | . | × |
| 21 | . | . | × | . | × | × | . | × |
| 22 | × | × | . | × | . | . | . | . |
| 23 | × | × | × | × | × | . | . | . |
| 24 | . | . | × | × | × | × | × | × |
| 25 | × | × | × | × | × | × | . | . |
| 26 | × | × | × | × | × | × | × | . |
| 27 | × | × | . | × | × | × | × | . |
| 28 | × | × | × | × | × | × | . | × |
| 29 | × | × | × | × | × | × | . | . |
| 30 | × | × | × | × | × | × | × | × |
| 31 | × | × | × | × | × | × | . | . |
| 32 | Present on all succeeding parapodia | | | | | | × | × |
| 33 | | | | | | | . | . |
| 34 | | | | | | | × | × |
| 35 | | | | | | | . | . |
| 36 | | | | | | | . | . |
| 37 | | | | | | | × | × |
| 38 | | | | | | | × | . |
| 39 | | | | | | | . | × |
| 40 | | | | | | | × | × |
| 41 | | | | | | | . | . |
| 42 | | | | | | | × | . |
| 43 | | | | | | | × | × |
| 44 | | | | | | | . | . |
| 45 | | | | | | | × | × |
| 46 | | | | | | | × | × |
| 47 | | | | | | | . | × |
| 48 | | | | | | | × | × |
| 49 | | | | | | | . | × |
| 50 | | | | | | | × | × |
| 51 | | | | | | | × | × |
| 52 | | | | | | | × | × |
| 53 | | | | | | | × | × |
| 54 | | | | | | | × | × |
| | | | | | | | Present on all succeeding parapodia | |

* Segments missing.

## Genus Rhynchonerella Costa, 1862

(Emended Claparède, 1868, *pro Rhynchonereella* Costa, 1862)

Prostomium extending beyond the eyes and carrying five antennae. Five pairs of tentacular cirri. Parapodia with a cirriform appendage on the pedal lobe; with simple and/or compound chaetae.

*Type species*. *Rhynchonerella gracilis* Costa, 1862.

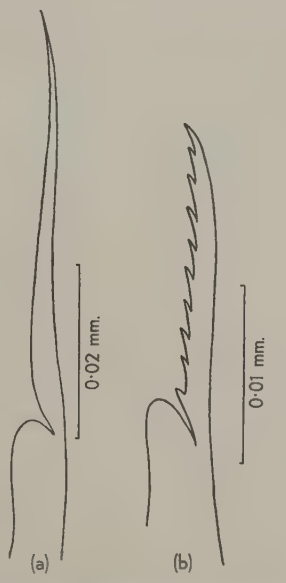
*Type locality*. Gulf of Naples.

### Rhynchonerella bongraini (Gravier), 1911, *n.comb.*

*Type locality*. Pelagic haul off the Ice Edge, 69° 15′ S., 108° 5′ W., brought from 950 m. to the surface.

*Callizona Bongraini* Gravier, 1911*a*, p. 312.
*Callizona Bongraini* Gravier, 1911*b*, p. 70, pl. 4, figs. 39–43.
*Callizona Bongraini* Gravier, 1911*c*, p. 694.
*Callizonella bongraini* Augener, 1929, pp. 294–300, fig. 2*a–g*.
*Callizona bongraini* Benham, 1929, pp. 189–90, pl. 1, figs. 11–12.
*Rhynchonerella fulgens* Monro, 1930, p. 83, fig. 26.
Alciopid larvae Hardy and Gunther, 1935, p. 117.
*Callizonella Bongraini* Fauvel, 1936*a*, pp. 18–19.
*Callizonella bongraini* Monro, 1936, p. 119.
*Krohnia Bongraini* Støp-Bowitz, 1948, p. 33.
*Krohnia Bongraini* Støp-Bowitz, 1949, pp. 9–12, figs. 3–4.
*Krohnia Bongraini* Støp-Bowitz, 1951, p. 8.

*Description*. The majority of specimens are not complete, except one which measures 13 mm. in length for fifty-one chaetigers with a width across the tips of chaetae of 3·5 mm. Of the incomplete specimens one measures 15 mm. long for fifty-nine chaetigers, and another 11 mm. for forty chaetigers. There are two pairs of short, foliaceous antennae set close together on the anterior border of the prostomium and a median, single, subulate antenna set in the middle of the dorsal surface in the groove between the two enormous spherical eyes. These eyes have a diameter of approximately 0·3 mm. each and cover about 90% of the prostomial surface. The five pairs of tentacular cirri are arranged thus $1+\frac{1}{1}+\frac{1}{1}$; the unpaired anterior is medium in length, the dorsal pair long (posterior longest, about 0·5 mm.), and the ventral pair short. Parapodia have large foliaceous dorsal cirri and smaller ventral foliaceous cirri; the cirriform appendage on the pedal lobe is very small. Characteristic compound chaetae with smooth or denticulated terminal articles (Text-fig. 12*a–b*) appear on the first seven or eight chaetigers. The chaetae with smooth articles are two to three times longer than the others but not so numerous. On the last two feet carrying compound chaetae, very much longer simple chaetae appear and gradually replace the former completely. Aciculae appear on all feet. Segmental glands are present, but rarely before the tenth foot; they are seldom pigmented. The proboscis is terminated by twelve blunt papillae.




Text-fig. 12. *Rhynchonerella bongraini*: compound chaetae with (*a*) smooth terminal articles, (*b*) denticulate terminal articles.

*Discussion*. No one has ever reported specimens of the species originally described as *Callizona bongraini* without compound chaetae on the anterior feet. Støp-Bowitz (1948, 1949 and 1951), however,

placed it in *Krohnia* Quatrefages, 1865, which genus has only simple chaetae. Clearly the species must be included in *Rhynchonerella*, which it approaches in having compound chaetae, in its cephalic appendages and in having an appendage on the pedal lobe. I have re-examined the specimens described by Monro (1930) as *R. fulgens* (B.M.(N.H.), Reg. no. 1930.10.8.905/906:912), from Sts. SS 33 and SS 53, and consider them to be *R. bongraini*. This misinterpretation was clearly due to the small size in *R. bongraini* of the pedal appendage, which is exceedingly difficult to see, because it can be hidden behind the large pedal lobe. All the material reported by Hardy and Gunther (1935) as alciopid larvae is not available for examination, but it is almost certain that they were dealing entirely with *R. bongraini*.

*General distribution.* *R. bongraini* is known only from the Antarctic Zone where it appears to be confined to the Antarctic Surface Water and the upper layers of the Warm Deep Water (see pp. 218–223).

### Rhynchonerella angelini (Kinberg) 1866

*Type locality.* China Sea, 20° S., 107° E.

*Krohnia Angelini* Kinberg, 1866, p. 242.
*Rhynchonerella Angelini* Greeff, 1876, p. 57.
*Callizona Grubei* Greeff, 1876, pp. 72–3, pl. 5, figs. 63–6, pl. 6, figs. 69–88.
*Callizona Grubei* Levinsen, 1885, p. 333, fig. 13.
*Callizona Angelini* Apstein, 1900, pp. 18–19, pl. 4, figs. 33–8.
*Callizona Angelini* Reibisch, 1905, pp. 4–5, figs. 7–8.
*Callizona Angelini* Southern, 1911, pp. 4–5.
*Callizona Angelini* Fauvel, 1916, pp. 68–9.
*Callizona Angelini* Fauvel, 1923, p. 215, fig. 81 *d–i*.
*Callizona angelini* Monro, 1930, p. 82.
*Callizona Angelini* Fauvel, 1932*a*, p. 17.
*Callizona angelini* Monro, 1936, p. 118.
*Callizona angelini* Wesenburg-Lund, 1939, pp. 41–2.
*Rhynchonerella Angelini* Støp-Bowitz, 1948, pp. 34–6.

*Description.* The largest specimen examined measures 67 mm. in length by 6 mm. wide across the tips of chaetae. Two pairs of very short but broad, almost dumpy, antennae are situated on a prostomial extension in front of the eyes; a single unpaired cirriform antenna occurs dorsally between the eyes. The five pairs of tentacular cirri are arranged thus $1+\frac{1}{1}+\frac{1}{1}$; the unpaired and two ventrals are short, the two dorsals long and conical. Over the anterior three-quarters of the body the parapodia have broadly foliaceous dorsal cirri which become elongate posteriorly; smaller, but still large, foliaceous ventral cirri; pedal lobes, each with a prominent cirriform appendage carrying two types of compound chaetae, an inferior group, short stout acicular bristles with short smooth terminal articles and a superior group with long smooth articles: the acicular bristles decrease in number posteriorly. In the last one-quarter of the body the overall width is gradually reduced to a minimum of 0·25 mm., and the body assumes an appearance which Wesenberg-Lund (1939) described as a 'whip-cord like tail'. Parapodial cirri are here considerably reduced in size but never entirely disappear, and chaetae though smaller are still present. Pigmented segmental glands are present on all feet. The proboscis is terminated by twelve small tubercles.

*General distribution.* *R. angelini* is widely reported from the Atlantic Ocean in which it probably has its southern limit of distribution at the Sub-Tropical Convergence (see p. 255).

## Genus Krohnia Quatrefages, 1865

Prostomium with five antennae. Five pairs of tentacular cirri. Parapodia with a cirriform appendage on the pedal lobe and with simple chaetae only.

*Type species.* *Alciopa lepidota* Krohn, 1845.

*Type locality.* Messina, Mediterranean.

### Krohnia lepidota (Krohn), 1845

*Alciopa lepidota* Krohn, 1845, p. 175.
*Krohnia lepidota* Quatrefages, 1865, pp. 158–9.
*Alciopa lepidota* Langerhans, 1880, p. 312.
*Callizonella lepidota* Apstein, 1891, p. 133.
*Callizonella lepidota* Apstein, 1900, p. 12, pl. 11, figs. 11–13.
*Callizonella lepidota* Fauvel, 1916, p. 67.
*Callizonella lepidota* Fauvel, 1923, pp. 211–12, fig. 79*e–h*.
*Callizonella lepidota* Wesenburg-Lund, 1939, pp. 38–40, fig. 25, chart 19.
*Krohnia lepidota* Støp-Bowitz, 1948, p. 33.

*Description.* All the specimens examined are fragments of which the longest is 50 mm. in length by 4 mm. wide across the tips of chaetae. Two pairs of small conical antennae are situated on the anterior border of the prostomium in front of the eyes and an unpaired cirriform antenna occurs dorsally between the eyes. The five pairs of tentacular cirri are arranged thus: $1+\frac{1}{1}+\frac{1}{1}$, of which the posterior dorsal is very much longer than the others, all of which are subequal. Parapodia have foliaceous dorsal cirri with an acuminate tip, small lanceolate ventral cirri, very long pedal lobes, each with a conspicuous appendage, and prominent simple chaetae. These last are of two types: stout acicular chaetae, more numerous anteriorly, and long fine chaetae which gradually replace the former posteriorly. The whole body surface is sprinkled with black spots, which run in lines along the antennae and tentacular cirri and are scattered over the eyes and prostomium; they are arranged in a linear series at the dorsal edge of the parapodia and ventrally at the base of the feet and in the mid-ventral line; the anterior surface of each pedal lobe has a single black spot in its centre. These spots show clearly only in well-preserved specimens, but in all material they are present and even when some have disappeared, an overall pattern similar to that described can be visualized.

*General distribution.* *K. lepidota* is known from the Atlantic but not in large numbers; it is possible that it has its southern limit of distribution at the Sub-Tropical Convergence (see p. 255).

## Genus Alciopa Audouin and Milne-Edwards, 1829

Body comparatively short and wide with a smaller number of segments than found elsewhere in the family. Prostomium with five antennae. Three pairs of tentacular cirri. Proboscis with two long cirriform appendages. Parapodia with foliaceous cirri; pedal lobe with two cirri and compound chaetae; no rudimentary parapodia present.

*Type species.* *Alciopa reynaudii* Audouin and Milne-Edwards, 1829.

*Type locality.* The Atlantic Ocean.

### Alciopa reynaudii Audouin and Milne-Edwards, 1829

*Alciopa Reynaudii* Audouin and Milne-Edwards, 1829, p. 202.
*Alciopa Reynaudii* Audouin and Milne-Edwards, 1833, p. 35.
*Nauphanta celox* Greeff, 1876, pp. 69–71, pl. 3, figs. 40–2, pl. 4, figs. 43–55.
*Nauphanta celox* Levinsen, 1882, p. 214, pl. 7, fig. 9.

*Greeffia oahuensis* McIntosh, 1885, pp. 182–3, pl. 28, figs. 5–7.
*Nauphanta celox*, Levinsen, 1885, pp. 331–2, figs. 11–12.
*Greeffia celox* Apstein, 1891, pp. 131–2, figs. 12–15.
*Greeffia celox* Apstein, 1900, p. 12, pl. 2, fig. 10.
*Greeffia celox* Reibisch, 1905, pp. 5–6, fig. 9.
*Greeffia celox* Southern, 1911, p. 3.
*Greeffia celox* Fauvel, 1916, p. 67.
*Greeffia celox* Fauvel, 1923, p. 208, figs. 78*a–c*.
*Greeffia oahuensis* Monro, 1930, pp. 82–3, fig. 25.
*Greeffia oahuensis* Monro, 1936, p. 118.
*Greeffia oahuensis* Wesenburg-Lund, 1939, pp. 35–6, fig. 23.
*Alciopa Reynaudii* Støp-Bowitz, 1948, p. 30, fig. 21.

*Description.* The longest complete specimen of *Alciopa reynaudii* measures 46 mm. long by 10 mm. wide across the tips of chaetae. One pair of short conical antennae is directed forward from the anterior border of the prostomium, and the other pair directed laterally from the side; the single antenna is dorsal between the eyes and is merely a knob-like structure on a pale surface area. There are three pairs of tentacular cirri, all small but the middle one longer than the others. All parapodia are well developed with large imbricated cordiform dorsal cirri, ventral foliaceous cirri, two cirriform appendages on the pedal lobe, long compound slender capillary chaetae and pigmented segmental glands. Each segment carries dorsally and ventrally dark brown lateral markings which may disappear after long periods in preservative fluid. The body tapers to a fine point at the pygidium and carries a long unpaired anal cirrus. The whole aspect of this species is one of massiveness when compared with the elongate fragile species in other genera of the family.

*General distribution. A. reynaudii* has been frequently recorded from the South Atlantic, where it has its southern limit of distribution at the Sub-Tropical Convergence (see p. 257).

### Genus Torrea Quatrefages, 1865

*Type species. Torrea candida* (Delle Chiaje), 1841.
*Type locality.* Sicily.

### Torrea candida (Delle Chiaje), 1841

*Alcyopa candida* Delle Chiaje, 1841, p. 98.
*Torrea candida* Monro, 1930, p. 82.
*Torrea candida* Monro, 1936, p. 119.

Monro (1930) reported this species from 'Discovery' Sts. 102, N 100 H, 104 m. (1) and 294, TYF, 100–150(–0) m. (1), and in 1936 from St. 714 TYFB, 246–0 m. (1) but all these specimens are fragmentary and not identifiable with accuracy.

## Family TYPHLOSCOLECIDAE

Exclusively pelagic. Body spindle-shaped or cylindrical. Prostomium not distinctly marked off from the rest of the body, terminated with a palpode, without eyes. Projecting nuchal organs present. Peristomium indistinct, bearing one pair of large foliaceous cirri. The two succeeding segments also bear only one pair, but thereafter there are two representing the dorsal and ventral cirri of the parapodia. Pedal mamelon reduced, with an acicula and a few small acicular chaetae visible. Two foliaceous anal cirri.

## Genus Typhloscolex Busch, 1851

Body short and spindle-shaped. Prostomium with dorsal and ventral ciliated epaulettes, the dorsal epaulette carrying two small wings. Chaetae begin on the fifth parapodia.

*Type species.* *Typhloscolex mülleri* Busch, 1851.

*Type locality.* Trieste.

### Typhloscolex mülleri Busch, 1851

*Typhloscolex Mülleri* Busch, 1851, pp. 115–16, pl. 11, figs. 1–6.
*Sagitella Bobretzkii* Wagner, 1872, p. 347, 2 figs.
*Sagitella barbata* Uljanin, 1878, pp. 6–8, pl. 1, fig. 2.
*Sagitella praecox* Uljanin, 1878, pp. 8–9, pl. 1, fig. 3.
*Acicularia Virchowii* Greeff, 1879*a*, pp. 237–45, pl. 13, figs. 1–18.
*Typhloscolex Mülleri* Greeff, 1879*b*, pp. 661–71.
*Typhloscolex Mülleri* Reibisch, 1895, pp. 52–3, figs. 7–14.
*Typhloscolex Mülleri* Reibisch, 1905, pp. 6–7, fig. 10.
*Typhloscolex mülleri* Ehlers, 1913, p. 530.
*Typhloscolex Mülleri* Fauvel, 1923, pp. 226–7, fig. 85*f–h*.
*Typhloscolex mülleri* Augener, 1929, pp. 307–8.
*Typhloscolex Mülleri* Monro, 1930, p. 90.
*Typhloscolex Mülleri* Fauvel, 1932*a*, p. 19
*Typhloscolex mülleri* Hardy and Gunther, 1935, p. 116.
*Typhloscolex* sp. Hardy and Gunther, 1935, p. 116.
*Sagitella cornuta* Hardy and Gunther, 1935, p. 116.
*Typhloscolex Mülleri* Fauvel, 1936*a*, p. 19.
*Typhloscolex Mülleri* Fauvel, 1939, p. 279.
*Typhloscolex Mülleri* Støp-Bowitz, 1948, p. 55.
*Typhloscolex Mülleri* Støp-Bowitz, 1949, pp. 17–18, fig. 8.
*Typhloscolex Mülleri* Støp-Bowitz, 1951, p. 10.

*Description.* Measurements of a selection of specimens are listed in Table 11 and indicate the size range found in this species.

Table 11. *Measurements of* Typhloscolex mülleri

| *Station no.* | *Net* | *Depth (m.)* | *Length (mm.)* | *Greatest width (mm.)* | *No. of parapodia* |
|---|---|---|---|---|---|
| 2530 | N 70 V | 500–250 | 2·0 | 0·5 | 20 |
| 1775 | N 70 V | 1000–750 | 2·5 | 1·0 | 20 |
| 103 | N 70 V | 500–250 | 2·8 | 0·5 | 17 |
| 1773 | N 70 V | 1500–1000 | 3·0 | 1·5 | 25 |
| 2531 | N 70 V | 750–500 | 3·0 | 1·5 | 24 |
| | | 750–500 | 3·0 | 0·5 | 25 |
| 2532 | N 70 V | 500–250 | 3·0 | 0·5 | 20 |
| | | | 3·0 | 0·5 | 24 |
| 666 | TYFV | 1000–750 | 3·5 | 2·0 | 21 |
| 1775 | N 70 V | 1000–750 | 5·0 | 1·0 | 26 |
| 2532 | N 70 V | 500–250 | 6·5 | 0·7 | 30 |
| 117 | N 70 V | 750–500 | 7·0 | 1·0 | 24 |

The ciliated epaulettes are approximately as wide as the body and arranged perpendicularly to its long axis; between them the finely pointed palpode projects forwards. At the base of the dorsal epaulette there are two small oval wings. On each side of the peristomium are the first cirri, large and kidney-shaped, covering the epaulettes laterally. On each of the next two segments there is a pair of oval cirri, and thereafter foliaceous dorsal and ventral cirri are present on all segments up to the end of the

body. In some specimens these are very distended and may contain sexual products. Simple chaetae and aciculae appear on the fifth parapodia. Two small elliptical anal papillae terminate the body posteriorly.

*Discussion.* I have re-examined the following specimens from Hardy and Gunther (1935, p. 116), *Sagitella cornuta* from Sts. WS 26, WS 30, WS 70, and *Typhloscolex* sp., from Sts. 137, WS 38 and WS 63, and consider them to be *T. mülleri*. Unfortunately all the material reported by Hardy and Gunther is not available for examination.

*T. mülleri* is closely related to *T. phyllodes* Reibisch, 1895 and *T. leuckarti* Reibisch, 1895 and all three have been reported from the same areas in the South Atlantic. *T. phyllodes* differs from *T. mülleri* in having ciliated epaulettes smaller than the body width, whereas in *T. leuckarti* the same organs are greater than the body width. Reibisch did not give measurements for the width of his specimens, but it is clear from his drawings that in both *T. phyllodes* and *T. leuckarti* the greatest width is about half the length. His drawings of *T. mülleri* show specimens about seven times as long as wide. In the material I have examined there are specimens from the same stations and depths covering these size ranges, yet in all of them the ciliated epaulettes are neither smaller nor larger than the body width.

In some of the widest of my specimens (possibly corresponding to *T. phyllodes* and *T. leuckarti* of Reibisch) sexual products are present in the cirri. I suggest, therefore, that *phyllodes* and *leuckarti* may represent the sexually maturing members of the population, and further that Reibisch's two species may be shown, when observations on the living animal have been made, to be synonymous with *T. mülleri*.

*General distribution. T. mülleri* is cosmopolitan and has been widely reported from the Atlantic (see pp. 231–236).

## Genus Travisiopsis Levinsen, 1885

Body cylindrical or spindle-shaped, prostomium with nuchal organs flanking a caruncle but without ciliated epaulettes. Otherwise similar to *Typhloscolex* except that it is much larger in the adult.

*Type species. Travisiopsis lobifera* Levinsen, 1885.

*Type locality.* 42° 50′ N., 46° 10′ W.

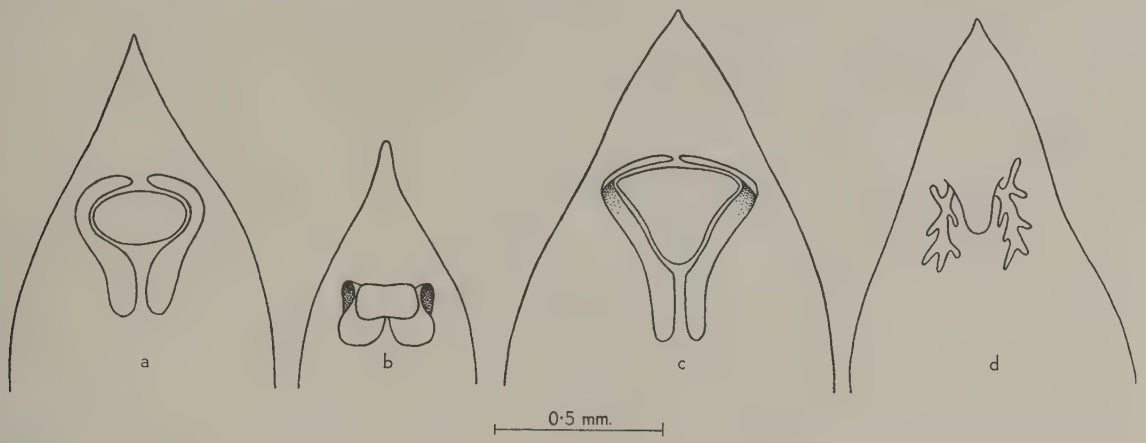
### Travisiopsis lobifera Levinsen, 1885

*Travisiopsis lobifera* Levinsen, 1885, pp. 336–40, figs. 17–20.
*Travisiopsis lobifera* Reibisch, 1895, p. 57.
*Travisiopsis lobifera* Southern, 1911, p. 31, pl. 1, fig. 4.
*Travisiopsis lobifera* Fauvel, 1916, pp. 73–4.
*Travisiopsis lobifera* Fauvel, 1923, p. 229, fig. 86*a–d*.
*Sagitella kowalewskii* Benham, 1929, p. 191 *nec Sagitella kowalewskii* Benham, 1927, pp. 80–1, pl. 2, figs. 33–4 (see *Travisiopsis levinseni*).
*Travisiopsis lobifera* Fauvel, 1932*a*, p. 19.
*Travisiopsis lobifera* Fauvel, 1932*b*, pp. 66–7.
*Travisiopsis lobifera* Støp-Bowitz, 1948, pp. 57–8, fig. 44.
*Travisiopsis lobifera* Friedrich, 1950*a*, pp. 315–19.
*Travisiopsis lobifera* Støp-Bowitz, 1951, p. 10.

*Description.* This cylindrical-shaped species may measure up to 25 mm. long by 4–6 mm. wide for a constant twenty-one segments. The median dorsal caruncle, situated between the peristomium and the first parapodia, is characteristically oval and wholly attached (Text-fig. 13*a*). Paired nuchal lobes surround the caruncle in the form of fixed processes anteriorly and laterally, with free projecting lobes posteriorly which reach as far as the single cirri of the second parapodia. The single cirri of the peristomium and the first two feet are circular, thereafter the parapodial cirri are heart-shaped. A group of the three acicular chaetae project from between the parapodial cirri from the sixth to seventh segment backwards. Anal cirri are variable in form from elongate oval to rectangular.

*Discussion.* I have re-examined Benham's 1929 specimens of *Sagitella kowalewskii* from the 'Terra Nova' Expedition, in the B.M.(N.H.) (Reg. no. 1929.9.20.3/4, Sts. 92 and 130), and find them to be *Travisiopsis lobifera* (the specimen from St. 282 is not in the B.M. collections). It will be noted from the synonymy that Benham's 1927 *Sagitella kowalewskii* material is not *Travisiopsis lobifera*, but *T. levinseni* (see below).

*General distribution.* *T. lobifera* is not common in the South Atlantic, but has been found to the north of the Sub-Tropical Convergence only (see p. 245).




Text-fig. 13. Prostomia of (*a*) *Travisiopsis lobifera*, (*b*) *T. levinseni*, (*c*) *T. lanceolata*, (*d*) *T. coniceps*, all with all lateral cirri removed but showing nuchal organs and lobes.

### Travisiopsis levinseni Southern, 1910

*Type locality.* 53° 7′ N., 15° 9′ W., 650–750 fathoms (1188·7–1371·6 m.).

*Travisiopsis levinseni* Southern, 1910, p. 429.
*Travisiopsis levinseni* Southern, 1911, pp. 32–3, pl. 2, figs. 7–10.
*Sagitella Kowalewskii* Gravier, ? 1911*b*, pp. 74–6, pl. 3, figs. 30–2, *nec* Wagner.
*Sagittella cornuta* Ehlers, 1912, p. 25 (in part) *nec Sagittella cornuta* Ehlers, 1913, pp. 527–9, pl. 39, figs. 8–14 (see *Travisiopsis lanceolata*).
*Sagittella opaca* Ehlers, 1913, p. 529, pl. 39, figs. 16–17.
*Travisiopsis Levinseni* Fauvel, 1916, p. 76.
*Travisiopsis Levinseni* Fauvel, 1923, pp. 229–30, fig. 86*h*, *i* and *k*.
*Sagitella Kowalewskii* Benham, 1927, pp. 80–1, pl. 2, figs. 33–4, *nec Sagitella Kowalewskii* Benham, 1929, p. 191 (see *Travisiopsis lobifera*).
*Sagitella Kowalewskii* Monro, 1930, pp. 89–90.
*Travisiopsis* sp. Monro, 1930, pp. 90–1.
*Travisiopsis Levinseni* Wesenburg-Lund, 1935, pp. 14–15.
*Travisiopsis benhami* Monro, 1936, pp. 123–4, fig. 17*a–c*.
*Travisiopsis Levinseni* Monro, 1939*a*, p. 346.
*Travisiopsis levinseni* Støp-Bowitz, 1948, pp. 59–60, fig. 46, fig. 47*a–b*.
*Travisiopsis levinseni* Støp-Bowitz, 1949, p. 19.
*Travisiopsis levinseni* Friedrich, 1950*a*, pp. 315–19.
*Travisiopsis benhami* Friedrich, 1950*a*, pp. 315–19.
*Travisiopsis benhami* Friedrich, 1950*c*, p. 15.
*Travisiopsis levinseni* Wesenburg-Lund, 1950*a*, p. 13.
*Travisiopsis Levinseni* Wesenburg-Lund, 1950*b*, p. 44.
*Travisiopsis Levinseni* Støp-Bowitz, 1951, p. 11.
*Travisiopsis levinseni* Wesenburg-Lund, 1951, p. 33.

*Description.* This species normally measures between 13–25 mm. in length by 4–6 mm. wide, though exceptionally specimens up to 34 mm. long have been found (for example, Monro, 1930, as *Travisiopsis* sp.). The body is spindle-shaped and there are twenty-five segments. Between the peristomium and the first parapodium is the rectangular caruncle with semi-circular nuchal lobes directed backwards from its posterior border (Text-fig. 13*b*). The lobes are continuous with, and part of, fixed nuchal processes which border the caruncle laterally. Cirri of the peristomium and first two parapodia are foliaceous; thereafter the paired parapodial cirri are rectangular becoming lanceolate posteriorly. A small group of three aciculae project from between the parapodial cirri; these are always variable in position and may begin anywhere between the sixth and thirteenth foot and continue up to the penultimate segment. Anal cirri are long and oval, supported by a central rib.

*Discussion.* I have examined the specimens listed below and consider them all to be *Travisiopsis levinseni.*

(*a*) From Monro, 1930, as *Sagitella kowalewskii*, 'Discovery', Sts. 17, 78, 85, 89, 116, B.M.(N.H.), Reg. no. 1930.10.8.793:805/6:902/3.

(*b*) From Monro, 1930, as *Travisiopsis* sp., 'Discovery', St. 100, B.M.(N.H.), Reg. no. 1930.10.8.1017.

(*c*) From Monro, 1936 as *Travisiopsis benhami* (Types) 'Discovery', Sts. 151, 575, 588 and 'William Scoresby', Sts. 35, 549, 55, 716 B.M.(N.H.), Reg. no. 1936.2.8.1192–1199.

(*d*) From Benham, 1927 as *Sagitella kowalewskii* 'Terra Nova', St. 275, B.M.(N.H.), Reg. no. 1928.2.29.10.

It will be noted from the synonymy that Benham's 1929, *Sagitella kowalewskii*, material is *Travisiopsis lobifera* (p. 196).

In 1912 Ehlers first described a species which he called *Sagittella cornuta* (*sic*), the two type specimens of which are in the B.M.(N.H.). One of these (Reg. no. 1911.11.1.61) is *Travisiopsis levinseni*, although small for the species (5 mm. long for twenty-five parapodia), and the other (Reg. no. 1911.11.1.62) although in a poor state of preservation appears to be *Sagitella kowalewskii* Wagner (1872). These specimens must not be confused with Ehlers 1913 material from the *Deutsche Südpolar-Expedition*, which is identical with *Travisiopsis lanceolata* (see below).

*General distribution. T. levinseni* has been reported from the Atlantic Ocean in all explored water masses (see pp. 236–237).

### Travisiopsis lanceolata Southern, 1910

*Type locality.* 51° 12′ N., 11° 55′ W., 500 fathoms (914·4 m.).

*Travisiopsis lanceolata* Southern, 1910, p. 429.
*Travisiopsis lanceolata* Southern, 1911, pp. 30–2, pl. 1, figs. 3, 5, 6.
*Sagittella cornuta* Ehlers, 1913, pp. 527–9, pl. 39, figs. 8–14 (in part), *nec* Ehlers 1912.
*Travisiopsis lanceolata* Fauvel, 1916, pp. 75–6.
*Travisiopsis lanceolata* Fauvel, 1923, p. 229, figs. 86*e–g*.
*Sagitella cornuta* Monro, 1930, p. 90, *nec* Ehlers, 1912.
*Travisiopsis lanceolata* Fauvel, 1932*a*, p. 20.
*Travisiopsis Lanceolata* (*sic*), Wesenburg-Lund, 1935, p. 13.
*Travisiopsis atlantica* Treadwell, 1936, pp. 62–3, figs. 30–3.
*Travisiopsis lanceolata* Monro, 1939*a*, p. 348.
*Travisiopsis lanceolata* Wesenburg-Lund, 1939, pp. 20–1.
*Travisiopsis atlantica* Treadwell, 1941, p. 22.
*Travisiopsis lanceolata* Støp-Bowitz, 1948, pp. 58–9, figs. 45–6.
*Travisiopsis lanceolata* Friedrich, 1950*a*, pp. 315–19.
*Travisiopsis lanceolata* Wesenburg-Lund, 1950*a*, p. 13.
*Travisiopsis lanceolata* Hartman, 1956, p. 277.

*Description.* This spindle-shaped species measures up to 31 mm. in length by 4–6 mm. wide for twenty-two segments. The median dorsal caruncle, situated between the peristomium and the first parapodia, is in the shape of a ∇ with the posterior portion not attached to the body surface, and with two long characteristic finger-shaped nuchal processes on either side, directed posteriorly (Text-fig. 13*c*, p. 197). These nuchal lobes curl around the caruncle anteriorly and almost meet; posteriorly they may reach to the fourth parapodia. Cirri on the first three segments are reniform; on succeeding parapodia they are almost square becoming lanceolate posteriorly. Anal cirri are lanceolate with a supporting central rib.

*Discussion.* I have re-examined Monro's (1930) specimen of *Sagitella cornuta*, from 'Discovery', St 258 (B.M.(N.H.), Reg. no. 1930.10.8.1067) and consider it to be *Travisiopsis lanceolata*. Some of Ehlers's 1913 material of *Sagitella cornuta* is clearly *Travisiopsis lanceolata* but his 1912 material, named *S. cornuta*, is *T. lobifera*.

*General distribution. T. lanceolata* is well known from the Atlantic Ocean where it probably has its southern limit of distribution at the Sub-Tropical Convergence (see p. 246).

### Travisiopsis coniceps (Chamberlin), 1919

*Type locality.* 5° 11′ S., 98° 56′ W., off Galapagos Islands.

*Sagittella lobifera* Ehlers, 1912, pp. 24–5, pl. 3, figs. 1–4.
*Plotobia coniceps* Chamberlin, 1919, pp. 156–7, pl. 66, figs. 2–4.
*Nuchubranchia palmata* Treadwell, 1928, pp. 481–2, figs. 66–8.
*Sagitella lobifera* Monro, 1930, p. 90.
*Sagitella lobifera* Monro, 1936, pp. 122–3.
*Sagitella lobifera* Monro, 1939*b*, p. 108.
*Travisiopsis coniceps* Støp-Bowitz, 1948, p. 61.
*Travisiopsis coniceps* Støp-Bowitz, 1951, pp. 11–12.
*Travisiopsis coniceps* Hartman, 1956, p. 277.

*Description.* This species is cylindrical in shape and measures between 18 and 30 mm. in length by 4–6 mm. wide, for twenty-two segments. In the median dorsal line, between the peristomium and the first parapodium, is the backwardly directed, tongue-shaped caruncle with characteristic pinnate nuchal lobes on either side (Text-fig. 13*d*, p. 197). The single cirri on the first three segments are heart-shaped, thereafter parapodial cirri are broadly foliaceous. Two or three aciculae project from between the parapodial lobes from the sixth foot posteriorly. Anal cirri are long and spatulate with a central rib.

*Discussion.* As Støp-Bowitz (1948) has pointed out the name *lobifera* is preoccupied in the genus *Travisiopsis* by Levinsen's species; the next name available is *coniceps*. I have re-examined the holotype of *Sagittella lobifera* (*sic*) Ehlers, 1912 (B.M.(N.H.), Reg. no. 1911.11.1.87) from 68° 52′ S., 178° 15′ E., and it is identical with *Travisiopsis coniceps*. In addition, I have examined the following specimens and consider them all to be *T. coniceps*:

(*a*) From Treadwell, 1928, as *Nuchubranchia palmata*, in the collection of the New York Zoological Society, by courtesy of Dr Beebe.

(*b*) From Monro, 1930, as *Sagitella lobifera*, 'Discovery', Sts. 78, 85, 100 (B.M.(N.H.), Reg. no. 1930.10.8.1018:1162:1177, respectively).

(*c*) From Monro, 1936 as *S. lobifera*, 'Discovery', Sts. 395, 590 (B.M.(N.H.), Reg. no. 1936.2.8. 1182–1189 and 1190–1191 respectively).

(*d*) From Monro, 1939*b*, as *S. lobifera*, B.A.N.Z.A.R.E., Sts. 27, 45, 96 (B.M.(N.H.), Reg. no. 1941.3.3.3948/53.

*General distribution. Travisiopsis coniceps* has been widely reported from the South Atlantic Ocean but never in large numbers (see p. 245).

## Family PHYLLODOCIDAE

Not exclusively pelagic. Body normally long and slender with numerous segments, except in the pelagic genera where it is short and wide and the number of segments is small and fixed within narrow limits. Prostomium normally with eyes and four or five antennae. First two or three segments with tentacular cirri. Parapodia uniramous or biramous with simple and/or compound chaetae; cirri normally present. Proboscis protrusible, usually with papillae, exceptionally with chitinous jaws. Anal cirri normally present.

### Subfamily *Lopadorhynchinae*

Exclusively pelagic. Prostomium with four antennae. Compound chaetae always present, simple chaetae may be absent. Anal cirri sometimes present.

### Genus Lopadorhynchus Grube, 1855

(Emended Malaquin and Dehorne, 1907 *pro Lopadorrhynchus* Grube, 1855)

Two dorsal antennae appear as extensions of the anterior lateral border of the prostomium and two ventral antennae are close to the mouth. Normally three pairs of tentacular cirri, exceptionally two. Parapodia uniramous and modified anteriorly so that the body is divided into two distinct regions: simple and compound chaetae are present supported by a prominent pedal lobe with acicula. Dorsal cirri present on all parapodia, ventral cirri may be absent on anterior feet, always present elsewhere. Proboscis smooth or papillate. Anal cirri absent.

*Type species.* *Lopadorhynchus brevis* Grube, 1855.

*Type locality.* Mediterranean.

In 1914 Bergström founded the genus *Prolopadorhynchus* to include species of *Lopadorhynchus* with ventral cirri on the first two parapodia. Most authors have adopted *Prolopadorhynchus* as a subgenus on this basis, but I see no purpose served by this division. The genus is not large enough to warrant artificial separation purely for convenience and the modifications, which have been ascribed by most authorities to anterior ventral cirri, make it difficult to define their presence or absence in several species, confusing rather than clarifying the situation.

#### Lopadorhynchus brevis Grube, 1855

*Lopadorrhynchus brevis* Grube, 1855, p. 100, pl. 3, fig. 15.
*Lopadorhynchus brevis* Kleinenburg, 1886, p. 21.
*Lopadorhynchus brevis* Reibisch, 1895, p. 35.
*Lopadorhynchus brevis* Lo Bianco, 1904, p. 52, pl. 24, fig. 121.
*Lopadorhynchus brevis* Ehlers, 1913, p. 463.
*Lopadorhynchus brevis* Bergström, 1914, p. 181.
*Lopadorrhynchus parvum* Chamberlin, 1919, pp. 114–16, pl. 17, figs. 6, 7.
*Lopadorrhynchus nans* Chamberlin, 1919, pp. 116–19, pl. 17, figs. 1–5.
*Lopadorhynchus brevis* Fauvel, 1923, p. 184, fig. 69K.
*Lopadorhynchus brevis* Monro, 1930, p. 78.
*Lopadorhynchus brevis* Monro, 1937, pp. 266–7.
*Lopadorhynchus brevis* Monro, 1939*a*, p. 347.
*Lopadorhynchus brevis* Wesenburg-Lund, 1939, pp. 12–15, figs. 8–10, chart 7.
*Lopadorhynchus brevis* Støp-Bowitz, 1948, p. 18.

*Description.* This species may measure 20 mm. long by 7 mm. wide, across the tips of chaetae for twenty-seven chaetigers, but normally specimens measure between 8–9 mm. by 4 mm. wide for twenty-two to twenty-four chaetigers. The body is divided into two separate regions at the posterior

border of the third chaetiger. The prostomium is wider than long, with a straight anterior border with two long dorsal and two short ventral antennae. Two eyes are present, but may not be visible in specimens preserved in alcohol. Three pairs of tentacular cirri are present, one dorsal and one ventral just behind the antennae and the third very small almost an appendage of the lower of these. The first three parapodia have no ventral cirri but a linear series of stout simple chaetae thicker than those from the fourth foot posteriorly; these have both compound and simple chaetae, grouped fan-wise about a spatulate pedal lobe, and ventral cirri. The compound chaetae have a heterogomph articulation and smooth, ovate terminal pieces. Dorsal cirri are long on the first three parapodia, thereafter they are lanceolate; ventral cirri are small and subulate.

*Discussion.* In 1919 Chamberlin described two new species, *Lopadorhynchus nans*, differing from *L. brevis* in the arrangement of simple chaetae, and *L. parvum* which is without eyes. Neither of these characters warrants specific separation. All species of *Lopadorhynchus* reported to have eyes lose the ocular pigment when preserved in alcohol, and the arrangement of chaetae in the parapodia varies from specimen to specimen within the same species. In describing *L. nans*, Chamberlin also referred to ventral cirri which, however, are clearly post-setal lobes.

*General distribution.* *L. brevis* has not been reported in large numbers from the South Atlantic and appears only to the north of the Sub-Tropical Convergence (see pp. 259–261).

### Lopadorhynchus uncinatus Fauvel, 1915

*Original localities.* From off the Azores and Monaco.

*Lopadorhynchus uncinatus* Fauvel, 1915, p. 3, fig. 2.
*Lopadorhynchus uncinatus* Fauvel, 1916, pp. 57–61, pl. 1, figs. 2, 3, pl. 4, figs. 4–14.
*Lopadorhynchus uncinatus* Fauvel, 1923, pp. 184–5, figs. 67*a–g*.
*Lopadorhynchus uncinatus* Fauvel, 1932*b*, p. 75.
*Lopadorhynchus uncinatus* Monro, 1936, pp. 113–14.
*Lopadorhynchus uncinatus* Monro, 1937, p. 266.
*Lopadorhynchus uncinatus* Wesenburg-Lund, 1939, pp. 10–12, figs. 6–7, chart 6.
*Lopadorhynchus uncinatus* Treadwell, 1939, pp. 207–8, fig. 35.

*Description.* This species measures up to 24 mm. long by 6 mm. wide, across the tips of chaetae, for a maximum of thirty-two chaetigers. The body is divided into two distinct regions at the posterior border of the second chaetiger. The prostomium is wider than long, pointed anteriorly with two long dorsal and two short ventral antennae. Two eyes may be present but the ocular pigment frequently disappears in alcohol; Monro (1936) for example, reported a specimen from 'Discovery', St. 714 with eyes, but these are not visible now. The first two pairs of tentacular cirri are long and subulate, lying dorsally and ventrally, just behind the antennae, the third is rudimentary at the base of the ventral pair. Parapodia of the first two chaetigers are much more prominent than the rest, they are large and stout, with up to seven strong unidentate hooks, grouped terminally, surrounded by a ruff or collar (possibly the modified ventral cirrus) and have a small dorsal cirrus: the whole foot is directed laterally. The succeeding feet are directed backwards and are thin and paddle-shaped with stout dorsal cirri and smaller ventral cirri with chaetae grouped fan-wise about the pedal lobe; both simple and compound chaetae are present in the first of these chaetigers, but gradually the latter replace the former entirely. The terminal article of the compound bristles is ovate with serrations on one side and the articulation is heterogomph. Dorsal cirri are short and conical, ventral cirri smaller than these and subulate.

*General distribution.* *L. uncinatus* has frequently been recorded from the South Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see pp. 259–261).

### Lopadorhynchus krohnii (Claparède), 1870

*Type locality.* Naples.

*Hydrophanes Krohnii* Claparède, 1870, pp. 464–6, pl. 11, fig. 2.
*Hydrophanes Krohnii* Viguier, 1886, pp. 385–7, pl. 22, figs. 1–10.
*Lopadorhynchus Viguieri* Reibisch, 1893, p. 253.
*Lopadorhynchus Viguieri* Reibisch, 1895, pp. 37–8, pl. 4, fig. 4.
*Lopadorhynchus viguieri* Ehlers, 1913, p. 463.
*Lopadorhynchus Krohnii* Bergström, 1914, pp. 180–2, fig. 68.
*Lopadorhynchus Krohnii* Fauvel, 1923, pp. 185–6, fig. 69*a–d*.
*Lopadorhynchus Krohnii* var. *simplex* Monro, 1930, p. 72, fig. 23.
*Lopadorhynchus Krohnii* var. *simplex* Monro, 1936, p. 113.
*Lopadorhynchus Krohnii* Wesenburg-Lund, 1939, pp. 15–16, fig. 11.

*Description.* A large specimen of this species may measure 10·5 mm. long by 3 mm. wide for twenty-three chaetigers, but normally the length varies between 5 and 7 mm. and the width is 2 mm. for twenty to twenty-two chaetigers. The body is divided into two distinct regions at the posterior border of the second chaetiger. The prostomium is twice as wide as long, with a rounded anterior border and two long dorsal and two very short ventral antennae. No eyes have been seen in the specimens examined. There are two pairs of elongate tentacular cirri. The first two chaetigers are directed laterally and are shorter and stouter than the rest; they have simple hooked chaetae and a dorsal cirrus but no ventral cirrus. The remaining parapodia are directed posteriorly and are thin and lanceolate with small dorsal cirri and short ventral cirri; chaetae are compound, with heterogomph articulation and serrated ovate terminal pieces, grouped fan-wise about the large lanceolate pedal lobe.

*Discussion.* In the specimens examined no simple chaetae were present posterior to the first two parapodia and in this respect the material differs from that widely reported from the Mediterranean (Wesenburg-Lund, 1939). I do not consider, however, that this warrants the erection of a new variety as Monro (1930) did in naming his material *L. krohnii* var. *simplex*. I find it identical with *L. krohnii*. It may be significant, all my material and Monro's being larger than the European, that simple chaetae may disappear with age and approaching sexual maturity, but clearly more material than at present available is required to confirm this.

*General distribution. L. krohnii* has been found at a number of stations in the South Atlantic where it has its southern limit of distribution at the Sub-Tropical Convergence (see pp. 259–261).

## Genus Pelagobia Greff, 1879

Prostomium with four antennae. Two pairs of tentacular cirri on the first chaetiger. Parapodia uniramous with dorsal and ventral cirri cylindrical (dorsal cirrus reduced or absent on the second chaetiger), with a chaetigerous mamelon, aciculae, and compound chaetae with denticulate terminal pieces. Proboscis smooth, pygidium with two anal cirri.

*Type species. Pelagobia longicirrata* Greeff, 1879.

*Type locality.* Arrecife, Canary Islands.

### Pelagobia longicirrata Greeff, 1879

*Pelagobia longicirrata* Greeff, 1879*a*, pp. 247–9, pl. 14, figs. 23–5.
*Pelagobia longocirrata* Viguier, 1886, pp. 377–82, pl. 21, figs. 1–13.
*Pelagobia longecirrata* Reibisch, 1895, pp. 21–4, pl. 2, figs. 1–9.
*Pelagobia longecirrata* Reibisch, 1905, pp. 3–4, figs. 4–6.
*Pelagobia longecirrata* Southern, 1909, p. 2, pl. 1, fig. 1.
*Pelagobia Viguieri* Gravier, 1911*a*, p. 311.

*Pelagobia Viguieri* Gravier, 1911*b*, pp. 62–5, pl. 2, figs. 22–5.
*Pelagobia longicirrata* Ehlers, 1912, p. 14.
*Pelagobia longicirrata* Ehlers, 1913, pp. 460–2 and p. 591.
*Pelagobia longicirrata* Bergström, 1914, pp. 186–7, fig. 70.
*Pelagobia longicirrata* Ditlevsen, 1914, p. 690.
*Pelagobia longicirrata* Fauvel, 1916, pp. 61–2, pl. 1, figs. 6, 7.
*Pelagobia viguieri* Chamberlin, 1919, pp. 122–5.
*Pelagobia longicirrata* McIntosh, 1921, p. 294.
*Pelagobia viguieri* Benham, 1921, pp. 57–8, pl. 7, figs. 58–60.
*Pelagobia longicirrata* Fauvel, 1923, p. 192, fig. 72*a–c*.
*Pelagobia longicirrata* McIntosh, 1923, pp. 435–7, pl. 134, figs. 4 and 4*a*.
*Pelagobia viguieri* Benham, 1927, p. 78 (in part).
*Pelagobia longicirrata* Augener, 1929, pp. 291–4.
*Pelagobia longicirrata* Hardy and Gunther, 1935, p. 113, fig. 52.
*Pelagobia longicirrata* Fauvel, 1936*a*, pp. 16–17.
*Pelagobia longicirrata* Monro, 1936, p. 114.
*Pelagobia longecirrata* Nolte, 1938, pp. 274–8, figs. 217–23.
*Pelagobia erinensis* Nolte, 1938, pp. 278–81, figs. 224–5.
*Pelagobia longicirrata* Fauvel, 1939, p. 276.
*Pelagobia viguieri* Treadwell, 1943, p. 33.
*Pelagobia longicirrata* Støp-Bowitz, 1948, p. 21.
*Pelagobia longicirrata* Friedrich, 1950*c*, pp. 14, 20.
*Pelagobia longicirrata* Wesenburg-Lund, 1950*b*, pp. 37–8, chart 9.
*Pelagobia longicirrata* Fauvel, 1951, p. 292.
*Pelagobia longicirrata* Støp-Bowitz, 1951, p. 6.
*Pelagobia viguieri* Uschakov, 1952, pp. 103–4, fig. 1.
*Pelagobia longicirrata* Fauvel, 1953*a*, p. 131, fig. 63*a–d*.
*Pelagobia viguieri* Uschakov, 1955, pp. 105–6, fig. 11.

*Description.* Normally measuring between 2 and 8 mm. in length for fifteen to twenty-five chaetigers, a large specimen of this species may be 12 mm. long. The body is slightly flattened dorso-ventrally and chaetae and cirri project far out from the body wall, so that the width of the body across the parapodial bases averages 0·8 mm. and the distance between the tips of chaetae is 3 mm. The prostomium is approximately cone-shaped, truncated anteriorly, carrying two eyes and four small antennae, two dorsal and two ventral. The two pairs of tentacular cirri are long and subulate and between each pair is a pedal mamelon with short chaetae. Each parapodium from the third chaetiger onwards (counting the segment carrying the tentacular cirri as the first chaetiger) is well developed, with pedal mamelon, acicula, compound chaetae and long dorsal and ventral cirri. The main shafts of the chaetae are smooth and without denticulation, the terminal articles are long and denticulated along one edge. The anal cirri are short and blunt.

*Discussion.* Some authors, Southern (1909), Chamberlin (1919) and Fauvel (1923), have described denticulations on the shaft of the chaetae in *P. longicirrata*, and this has caused confusion in the status of *P. serrata* Southern, 1909, and *P. viguieri* Gravier, 1911. Originally, *P. longicirrata* was described with the terminal article of the chaetae denticulated and the shaft smooth. This was accepted until Southern (1909), in describing a new species, *P. serrata*, with denticulations on the shaft, described similar, but less clear, denticulations on the shafts of chaetae of specimens he assigned to *P. longicirrata*. I have examined the specimens described by Southern (1909) as *P. longicirrata*, in the Dublin Museum and the B.M.(N.H.) collections (Reg. no. 1909.11.29.1), and their chaetae have completely smooth shafts. Furthermore, being able to examine the original specimens of *P. serrata* in the Dublin and the B.M. (N.H.) collections (Reg. no. 1909.11.29.2), I have been able to compare the shafts of

the chaetae in these two species. The only species with serrations on the shaft is *P. serrata*; *P. longicirrata* has smooth shafts. Chamberlin (1919) and Fauvel (1923) appear to have followed Southern in recording that *P. longicirrata* has a denticulated shaft without having specimens illustrating it. On the other hand, Fauvel (1916), Monro (1936) and Støp-Bowitz (1948 and 1949) in reporting *P. longicirrata* all made particular reference to the presence of smooth shafts on the compound chaetae. The lack of denticulations was attributed either to inferior microscopic magnification, or regarded as being only of varietal importance. When Gravier (1911*a*) first described *P. viguieri*, he assigned to it characters which, compared with those of *P. longicirrata*, are due only to differences in growth (large cirri, number of segments, extent of the nuchal organs) except for the shape of the chaetae. His description of the chaetae is similar to mine above for *P. longicirrata*, but he was clearly influenced by Southern's diagnosis and probably felt that because the shafts of the chaetae in his specimens were smooth, they must be separated from a species which had denticulated shafts. Benham (1921 and 1929) assigned specimens to *P. viguieri* without considering *P. longicirrata*, which he probably overlooked; some of this material is in the B.M.(N.H.) collections (Reg. no. 1928.2.29.14/18:20), and it is identical with my Discovery material.[1] Treadwell (1943) and Uschakov (1952 and 1955) appear to have followed Chamberlin (1919) and Fauvel (1923), in describing specimens as *P. viguieri*.

In submitting, therefore, that *P. viguieri* is a synonym of *P. longicirrata*, I have purposely not considered the status of *P. serrata*. This species has been reported by Southern (1909) from off the Irish Coast and by Fauvel (1916) from the Azores and Monaco. It is clearly different from *P. longicirrata*, but whether or not this difference warrants specific status depends on an examination of many more specimens than are now available.

*General distribution.* *P. longicirrata* is cosmopolitan, but exhibits important geographical and seasonal patterns of distribution within the Antarctic and Sub-Antarctic Zones (see pp. 237–242).

## Genus Maupasia Viguier, 1886

Prostomium with four antennae. Three pairs of tentacular cirri. Parapodia uniramous with dorsal and ventral cirri, and compound chaetae only. Proboscis smooth. Anal cirri rudimentary.

*Type species.* *Maupasia caeca* Viguier, 1886.

*Type locality.* Bay of Algiers.

### Maupasia caeca Viguier, 1886

*Maupasia coeca* Viguier, 1886, pp. 382–5, pl. 21, figs. 14–20.
*Maupasia caeca* var. *atlantica* Southern, 1909, pp. 4–5, pl. 1.
*Maupasia caeca* Ehlers, 1912, p. 15.
*Maupasia caeca* Ehlers, 1913, p. 462.
*Maupasia caeca* Fauvel, 1916, p. 63.
*Maupasia caeca* Fauvel, 1923, pp. 190–1, fig. 71*a–d*.
*Maupasia caeca* Hardy and Gunther, 1935, p. 115.
*Maupasia coeca* Wesenburg-Lund, 1939, pp. 19–20, fig. 15, chart 11.

*Description.* This species measures up to 6 mm. long by 1 mm. wide across the bases of parapodia and up to 3 mm. wide across the tips of chaetae; the number of chaetigers varies between fifteen and eighteen. The small prostomium is approximately circular in shape, with two dorsal and two ventral antennae, equal in length, on the outer anterior margins. Two pairs of long tentacular cirri are situated immediately behind the prostomium on each successive segment, not clearly separated from each other but distinctly marked off from the segment behind. Each pair of tentacular cirri have

[1] These specimens are from 'Terra Nova', Sts. 275 and 288 respectively, the specimen from St. 343 (B.M.(N.H.), Reg. no. 1928.2.29.19) is *Maupasia caeca* (see Benham, 1921).

compound chaetae between them. The following segments bear parapodia with characteristic foliaceous dorsal and lanceolate ventral cirri. In the larger specimens the dorsal cirri contain genital products. All chaetae are heterogomph spingers with straight smooth terminal pieces. Anal appendages are very small circular cirri.

*General distribution.* The few records indicate a wide distribution in the S. Atlantic (see p. 242).

### Phalocrophorus pictus Greeff, 1879

This phyllodocid belongs to the subfamily Iospilinae. One specimen was reported by Hardy and Gunther (1935) from St. WS 63 on the December to January 1926–7, South Georgia Survey. Ehlers (1913) previously recorded it from the Indian Ocean sector of the Antarctic Zone; Augener (1929) reported it from the Weddell Sea and Fauvel (1936*a*) records it from the 'Belgica' collections in the Pacific Antarctic sector. North of the Sub-Tropical Convergence in the South Atlantic Ocean *P. pictus* was reported by Reibisch (1895), Friedrich (1950*c*) and Støp-Bowitz (1951). This species has not been found in the present surveys and is known from too few records to permit an adequate analysis of its distribution.

## Family APHRODITIDAE

Not exclusively pelagic. Prostomium normally with four sessile or pedunculate eyes, one to three antennae and two palps. Protrusible proboscis crowned with papillae and frequently with chitinous jaws. A feature of this family is the possession of elytra on the dorsal surface of the parapodia, of which the first pairs are always attached to segments 2, 4, 5 and 7, thereafter the arrangement varies. Parapodia biramous, exceptionally reduced.

### Subfamily *Polynoinae*

Not exclusively pelagic. Twelve or more pairs of elytra, inserted on segments 2, 4, 5, 7, 9–23, thence sometimes on every third segment up to the end of the body.

### Genus Lagisca Malmgren, 1865

Not exclusively pelagic. Fifteen pairs of elytra, normally covering the greater part of the body except the posterior extremity. Proboscis with chitinous jaws. Parapodia biramous.

*Type species. Lagisca extenuata* (Grube), 1840.

*Type locality.* Mediterranean—not pelagic.

### Lagisca hubrechti (McIntosh), 1900

*Original localities.* From the North-west Atlantic.

*Evarne Hubrechti* McIntosh, 1900, pp. 360–3, pl. 28, fig. 6, pl. 30, fig. 10, pl. 33, fig. 1, pl. 40, figs. 1–4
*Lagisca Hubrechti* Fauvel, 1914*a*, pp. 67–8, pl. 4, figs. 11–17.
*Lagisca Hubrechti* Fauvel, 1914*b*, pp. 3–4.
*Lagisca Hubrechti* Fauvel, 1916, pp. 28–32, pl. 1, fig. 1, pl. 3, figs. 1–5, 9–14.
*Lagisca Hubrechti* Fauvel, 1923, pp. 78–80, fig. 29*a–k*.
*Lagisca hubrechti* Monro, 1930, p. 45.
*Lagisca Hubrechti* Fauvel, 1932*a*, pp. 10–11.
*Lagisca hubrechti* Wesenburg-Lund, 1939, pp. 6–7, fig. 3, chart 3.
*Lagisca Hubrechti* Støp-Bowitz, 1948, pp. 11, fig. 8.

*Description.* The largest specimen of *Lagisca hubrechti* examined was reported from St. 100 by Monro (1930) and is 22 mm. long by 13 mm. wide across the tips of chaetae, having the full complement of fifteen elytrophores. Other specimens are smaller than this and range from 5 mm. long by 4 mm. wide for twelve elytrophores. Notopodial chaetae are stout, transparent and unidentate

with a serration along one edge; neuropodial chaetae are transparent and unidentate, beset with very small spines; occasionally a superior chaeta in the neuropodial group may be bidentate. There is a characteristic large caudal appendage terminating the body posteriorly.

*General distribution.* Only one record of this species is known south of the Sub-Tropical Convergence in the South Atlantic (see p. 259).

The following species of Polynoinae were reported from the collections of 'Discovery' by Monro (1930) but have not been found in the present work.

### Nectochaeta caroli Fauvel, 1914

*Nectochaeta caroli* Monro, 1930, p. 46, from St. 273, TYF, 200–230(–0), 3 specimens; St. 276, N 100, 100(–0) m., 29 specimens.

### Podarmus atlanticus Monro, 1930

*Podarmus atlanticus* Monro, 1930, pp. 42–3, from St. 282 TYF, 300(–0) m., 1 specimen.

Støp-Bowitz (1948) reports this species from the North Atlantic and considers that Monro's material could not have the forty-five segments described, if it had the fourteen pairs of elytra of the original generic diagnosis by Chamberlin (1919). In fact, Monro's type (B.M.(N.H.), Reg. no. 1930.10.8.236), has forty-five chaetigers and eighteen pairs of elytrophores, as originally described. Clearly the species is too little known to warrant accurate assessment, but it may represent the pelagic phase of a benthic species.

### Sheila bathypelagica Monro, 1930

*Sheila bathypelagica* Monro, 1930, pp. 43–5, fig. 8, from St. 256, TYF, 850–1100 m., 1 specimen.

### Antinoë pelagica Monro, 1930

*Antinoë pelagica* Monro, 1930, pp. 63–5, fig. 16, from St. 45, NCS-T, 238–270 m., 1 specimen, and St. SS 18, N 70 V, 50–0 m., 1 specimen.

### Macellicephala McIntosh, 1885

*Macellicephala* sp. Monro, 1930, St. 144, NCS-T, 155–178 m., 1 specimen.

In 1936 Monro reported the following species from the collection of 'Discovery II':

### Harmothoë benthophila Ehlers, 1913

*Harmothoë benthophila* Monro, 1936, pp. 87–8, from St. 702, TYFB, 236–0 m., 1 specimen. I have not found this species in the present survey.

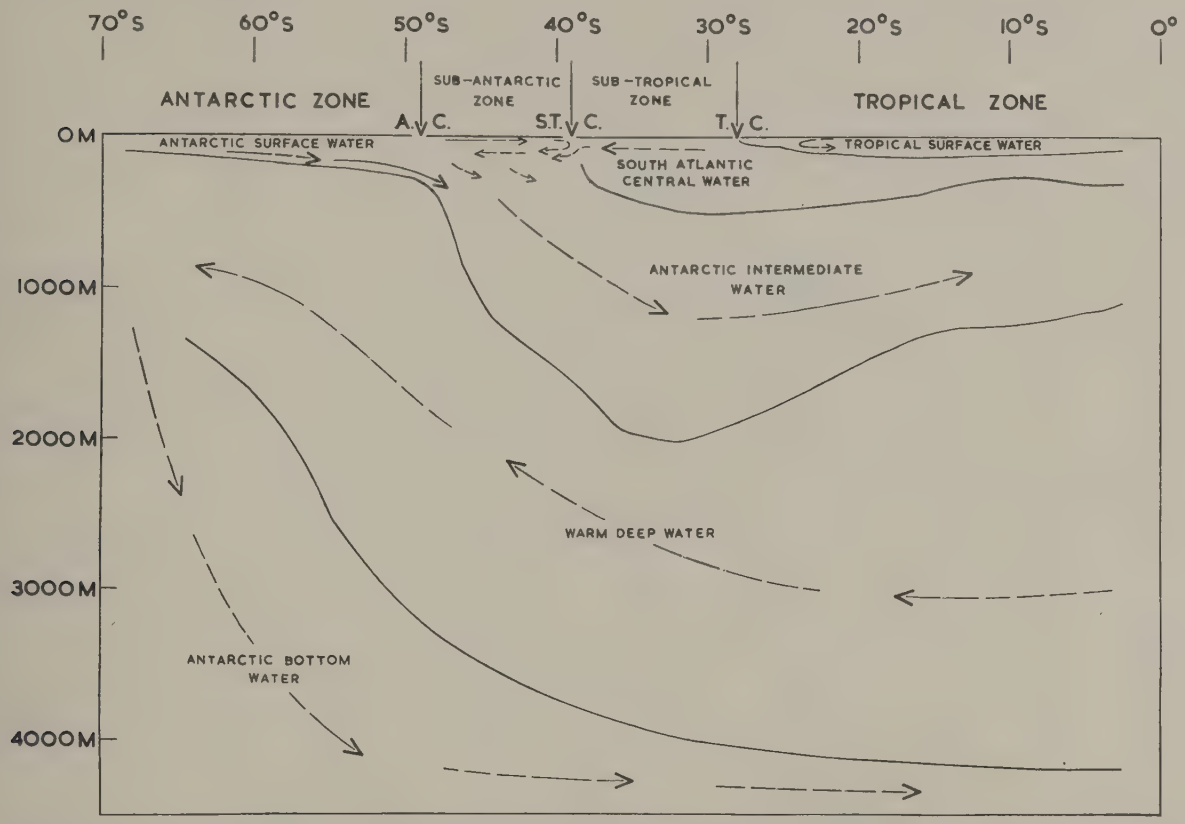
## ZOOGEOGRAPHY

### 1. Hydrological Environment

In the South Atlantic Ocean four hydrological zones can be recognized, the Antarctic, Sub-Antarctic, Sub-Tropical and Tropical (Text-fig. 1, p. 165). Each zone has a characteristic surface water mass beneath which are intermediate, deep and bottom water masses not confined by any surface zonation (Text-fig. 14).

It cannot be over-emphasized that neither the zones nor the water masses can be rigidly defined; they are subject to continual fluctuation and considerable intermixing. In the distribution maps, therefore, their positions correspond as nearly as possible with conditions existing when the samples were collected at the stations shown; in consequence these positions depart a little from the average estimated from all available data by Deacon (1933, 1937) and Mackintosh (1946).

Text-figs. (15–22[1]) of temperature and salinity sections on the Greenwich Meridian have been prepared from data in the Discovery Station Lists. They indicate the seasonal and depth fluctuations in hydrological conditions and the movements of the principal water masses. I have drawn freely from the work of Deacon (1933, 1937) on the hydrology of the Antarctic Sector of the South Atlantic and along the meridian of 30° W., and from Mackintosh (1946) on the varying positions of the Antarctic Convergence.

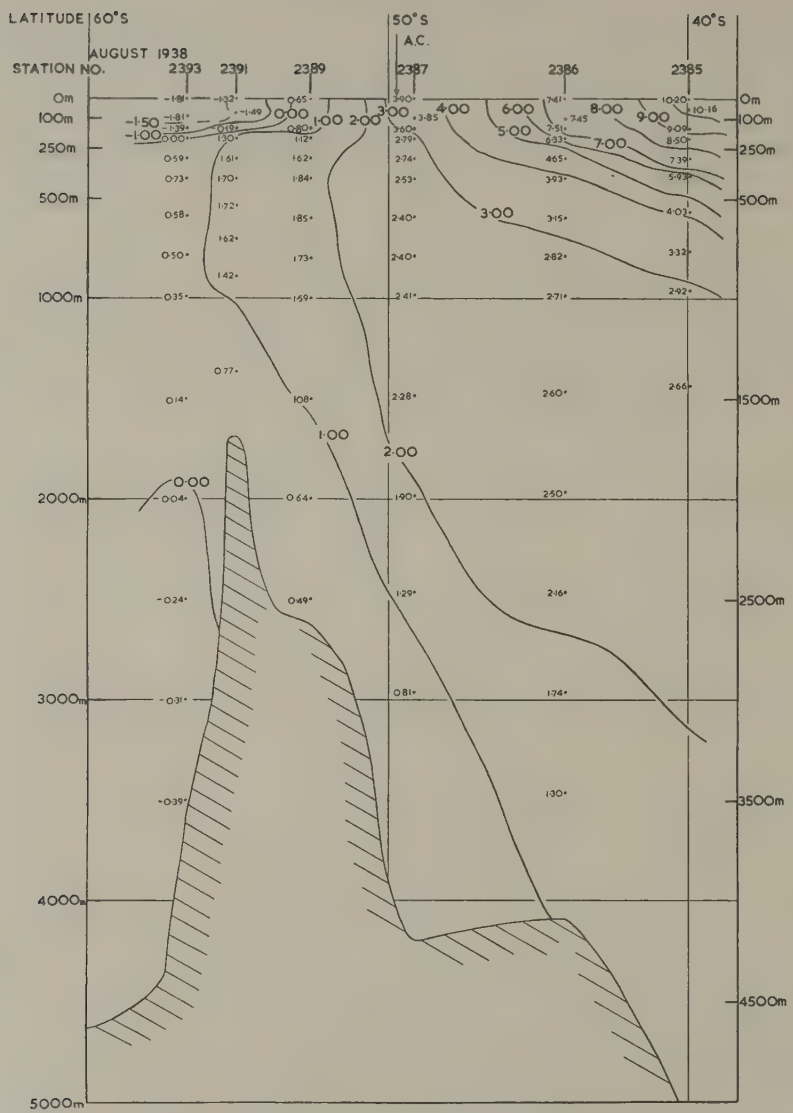



Text-fig. 14. Diagram indicating the circulation of water approximately along the meridian of 30° W. The arrows indicate the general movement of the water masses. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence, T.C. = Tropical Convergence.

### (i) SURFACE WATER MASSES

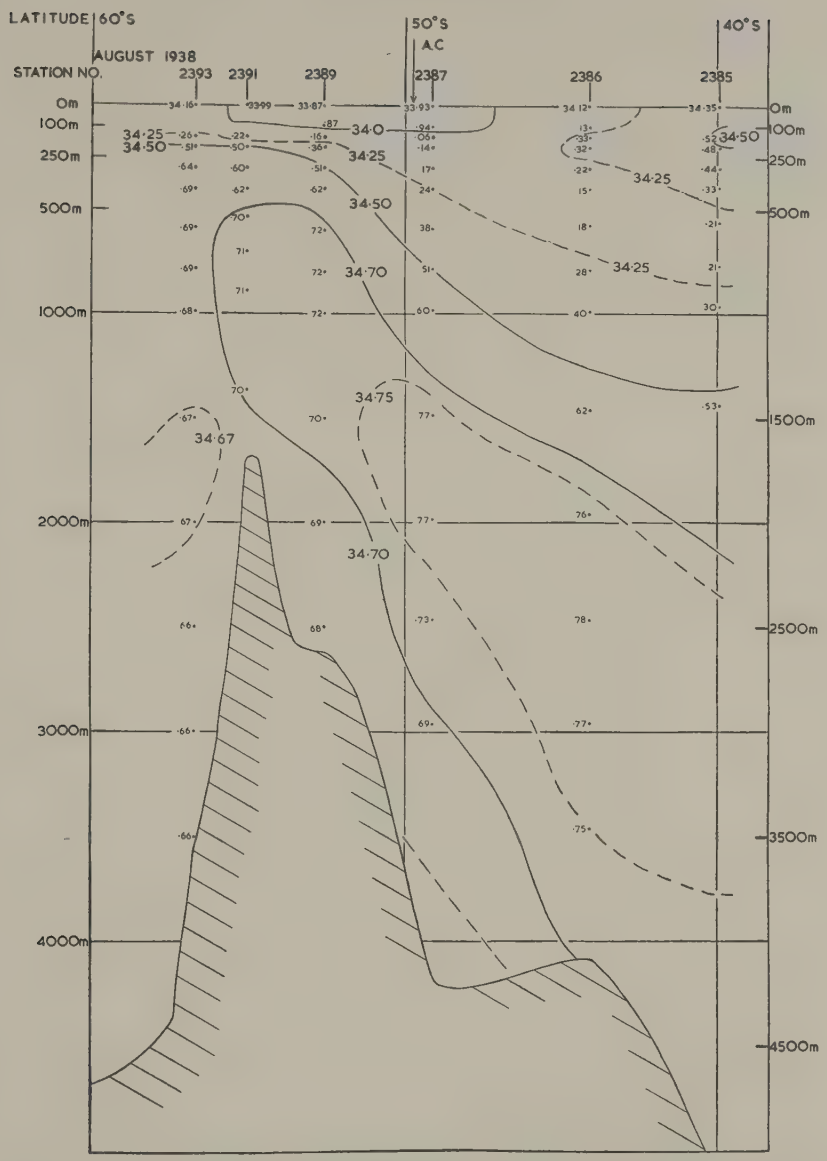
(*a*) *Antarctic Surface Water* is found around Antarctica as a cold poorly saline layer lying in the surface 100–250 m. above warmer water of higher salinity. In the South Atlantic Ocean, three main sources of water contribute to its composition: (1) Water from the Bellingshausen Sea which flows in along the southern side of the Drake Strait, (2) water flowing out of the Weddell Sea in a north-easterly direction, and (3) water from the East Wind Drift which flows in a westerly direction from the southern Indian Ocean into the Weddell Sea. Of these three components the Weddell Sea Water (Weddell Drift) probably exerts the greatest influence because in winter it carries the main body of pack-ice across the South Atlantic.

[1] The vertical scale in these sections has been much exaggerated, and to avoid confusion all the readings have not been included on the figures but they have all been taken into account in drawing the isotherms and isohalines. It is not considered that temperature and salinity are more, or less, important than other hydrological features but they are more easily interpreted and for this reason have been more widely used.




Text-fig. 15. Distribution of temperature (° C.) between 60° S. and 40° S. in the region of the Greenwich Meridian, August 1938 (see Text-fig. 4*b* for station positions).

The distribution of the pack-ice has a marked effect on the salinity and temperature of Antarctic Surface Water, and varies from season to season. During the winter months of June to August, the pack-ice extends to about 55–56° S. (Mackintosh and Herdman, 1940); surface temperatures are very low with a minimum of −1·81° C. (Text-fig. 15) and the open water has a salinity of about 34·00 ‰ (Text-fig. 16). In summer the pack-ice melts, causing dilution of the upper layers; at the same time absorption of radiation brings about an increase of surface temperature. As mixing proceeds well-marked discontinuity layers are set up. These effects are shown in the hydrological sections for January 1939, in which the surface temperatures are all above 0·0° C. (Text-fig. 17), and a belt of poorly saline water, with a salinity of less than 34‰, covers the surface to about 50–20 m. depth and extends from the higher latitudes as far north as about 55° S. (Text-fig. 18).

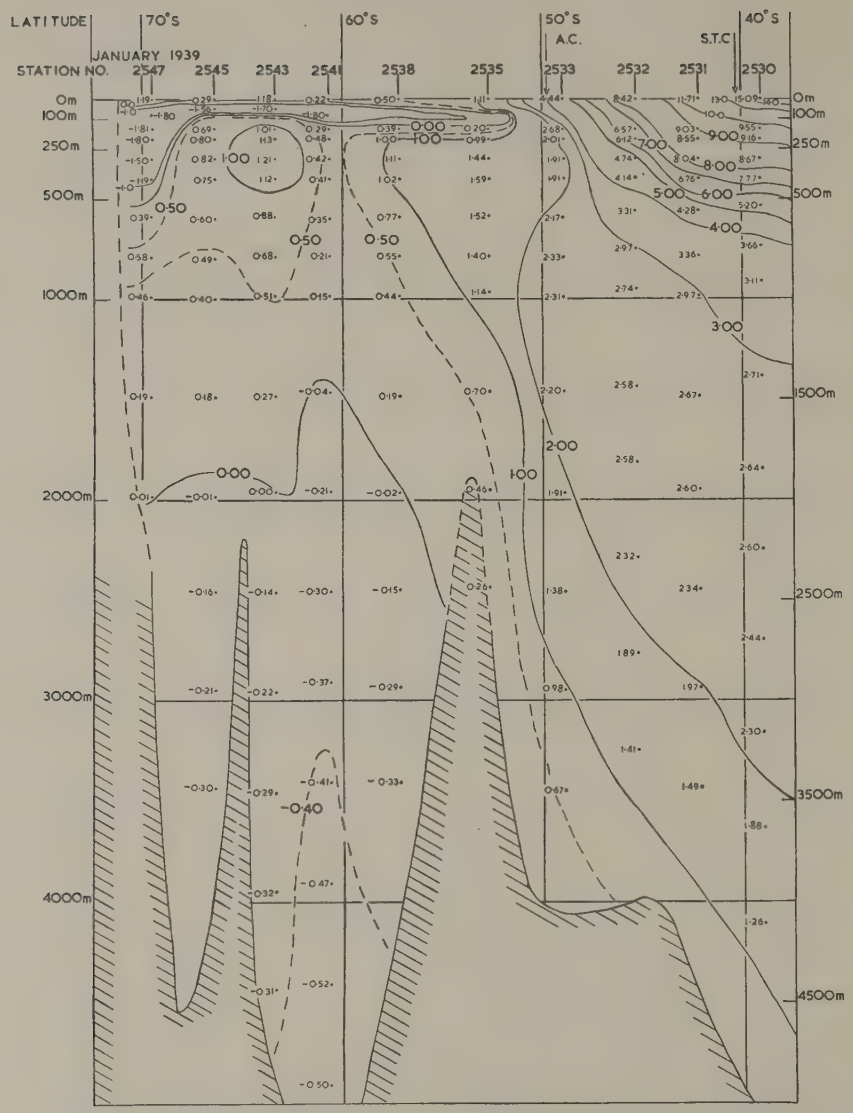



Text-fig. 16. Distribution of salinity (‰) between 60° S. and 40° S. in the region of the Greenwich Meridian, August 1938.

The Bellingshausen Sea Current is slightly warmer than the Weddell Drift; consequently, where these two currents meet, the colder Weddell water sinks below the lighter Bellingshausen water. The resulting convergence is normally marked by a mean temperature difference in the top 100 m. of 1° to 1·5° C. In Text-figs. 4*a* and 4*b* (p. 167) the position of this boundary is shown for stations made about the Greenwich Meridian; details are given in Table 12 for the stations in the hydrological sections (Text-figs. 15, 17, 19, 21).

The two types of water can be traced across the Scotia Sea, around South Georgia, and as far east as the longitude of Bouvet Island (Deacon, 1937, p. 25).

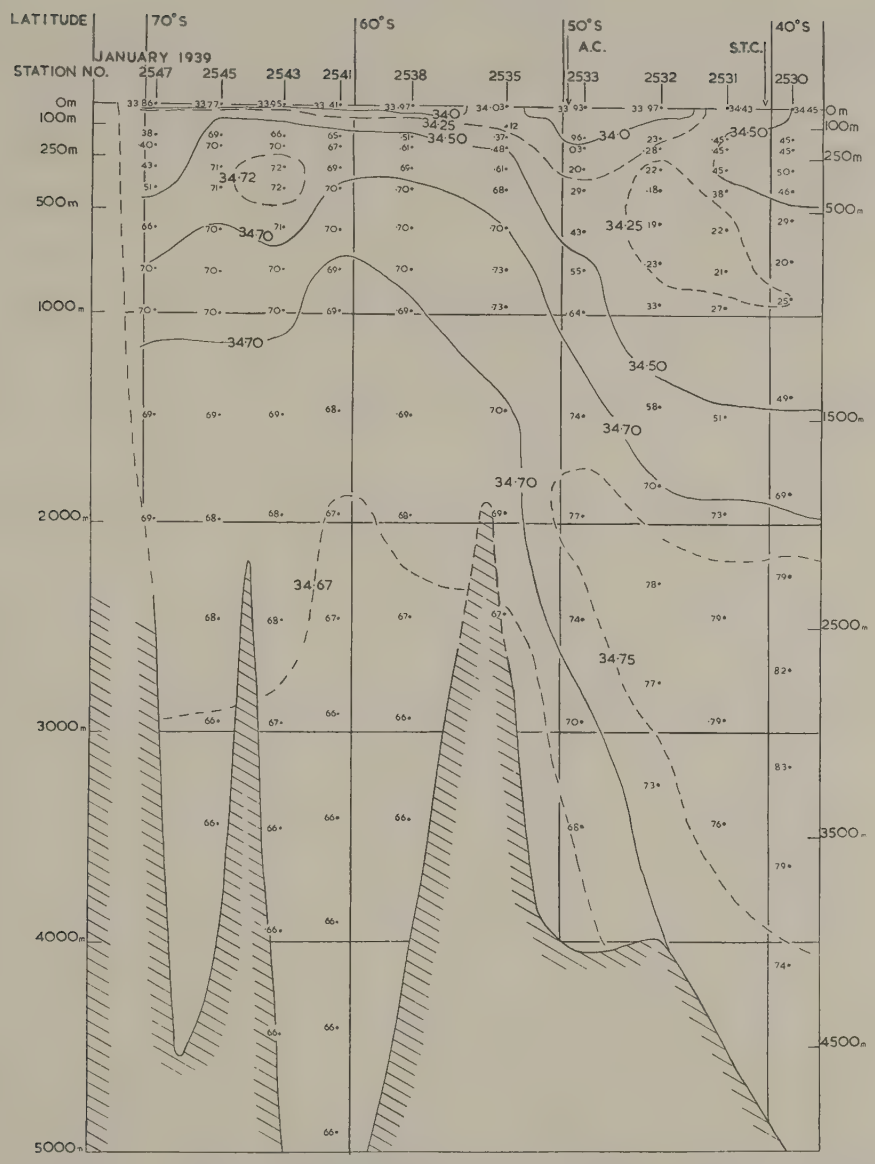
The main direction of movement of the Antarctic Surface Water is north-eastward across the South Atlantic Ocean, with an occasional swing to north or south. To the west of South Georgia there is




Text-fig. 17. Distribution of temperature (° C.) between 70° S. and 40° S. in the region of the Greenwich Meridian, January 1939 (see Text-fig. 4*a* for station positions).

Table 12

| Date | *Station no.* Weddell water | *Station no.* Bellingshausen water | *Mean temperature ° C., in top 100 m.* Weddell water | *Mean temperature ° C., in top 100 m.* Bellingshausen water | *Temperature difference* (° C.) |
|---|---|---|---|---|---|
| June 1936 | 1779 | 1778 | −0·81 | +0·68 | 1·49 |
| March 1937 | 2018 | 2020 | +0·41 | +1·60 | 1·19 |
| August 1938 | 2391 | 2389 | −1·37 | +0·61 | 1·97 |
| January 1939 | 2538 | 2535 | −0·36 | +0·75 | 1·11 |




Text-fig. 18. Distribution of salinity (‰) between 70° S. and 40° S. in the region of the Greenwich Meridian, January 1939.

'a small southward movement', which 'causes the south-west coast of the island to be bathed with water from the Bellingshausen sea current whilst the Weddell Current is held off shore' (Deacon, 1937, p. 32). North-east of South Georgia, movement is more to the north and the Weddell Current normally has an important influence off this coast of the island. East of the Greenwich Meridian in the higher latitudes, the East Wind Drift flows westward along the Antarctic continent into the Weddell Sea.

Antarctic Surface Water extends northwards until it meets and mixes with the warmer, lighter Sub-Antarctic Surface layer, and sinks below it along a well-marked line, the ANTARCTIC CONVERGENCE. The position of the convergence can normally be recognized by a sharp change in surface temperature. In summer, when the convergence is crossed from south to north, an increase from 3°

to 5·5° C. is normal; in winter a rise from 1° to 3·5° C. occurs. The salinity in this region is about 33·93‰. When the surface temperature change is not sharply marked, the position of the Antarctic Convergence is indicated by the sinking of the coldest part of Antarctic Surface Water below 200 m. For example, in March 1937 'Discovery II', crossed the convergence in 49° 50′ S. north of St. 2022, and although no very sharp change in the surface temperatures between Sts. 2022 and 2023 is apparent, experience shows that the prominent northerly bend of the 2·00° C. isotherm between 200 and 300 m. in this area (Text-fig. 19) indicates the position of the convergence.

In August 1938, January 1939 and May 1936 the Antarctic Convergence lay in the positions indicated in the temperature and salinity sections for these months (Text-figs. 15–16, 17–18, 21–22). In April 1931, Deacon (1933) found it to occur along the meridian of 30° W., just north of St. 666; in March 1938 its position lay between Sts. 2292 and 2293 (Mackintosh, 1946).

(*b*) *Sub-Antarctic Surface Water* extends to greater depths than the Antarctic Surface layer. From south to north, the surface temperatures increase from approximately 3° to 11·5° C. in winter, and from 5·5° to 15·0° C. in summer; the salinity is low varying between 33·85 to 34·65‰. No discontinuity layers are set up and vertical mixing takes place. In consequence, it is not possible to define any boundary between the Sub-Antarctic Surface Water and the underlying Antarctic Intermediate layer.

In the upper layer of Sub-Antarctic Surface Water movement is a little to the north of east continuously around the continent. In the middle layers the principal component of movement is to the south, and below this to the north again (Text-fig. 14). Between the Falkland Islands and South Georgia the position of the Antarctic Convergence is less sharply defined than elsewhere because Sub-Antarctic Surface water moves southwards and rather confused conditions exist. South and west of the Cape of Good Hope also, confused conditions are found because of an admixture of sub-tropical water from the opposed Agulhas current. Böhnecke (1938) distinguished a secondary polar front in the Sub-Antarctic Zone, which Deacon (1945) has confirmed from Discovery observations south of the Agulhas current. Along the Greenwich Meridian this boundary lies approximately in latitude 45° S. and separates water of mixed origin in the southern half of the Sub-Antarctic Zone from more stably stratified water in the northern half. It has a marked effect on the distribution of *Pelagobia longicirrata*.

The northern boundary of the Sub-Antarctic Zone is at the *Sub-Tropical Convergence* where Sub-Antarctic Surface Water sinks but does not move to the north. It either mixes with Sub-Tropical Water moving south or wells up to the surface. At the Sub-Tropical Convergence a much sharper change of temperature and salinity takes place than at the Antarctic Convergence and it has a much greater influence on the distribution of pelagic polychaetes. In Table 13, the hydrological details and positions of the stations adjacent to the Sub-Tropical Convergence have been listed.

Deacon (1933) has given an analysis of the conditions prevailing in April 1931 and further details of the lines of stations made since 1936 are shown in Text-figs. 17–22.

In the vicinity of Tristan da Cunha a variation of 6° of latitude in the position of the Sub-Tropical Convergence is possible (Deacon, 1945), and St. 4, made in January 1925, with a surface temperature of 14·59° C. and a salinity of 34·85‰, very close to the Sub-Tropical Convergence, is of uncertain hydrological position. No details are available for St. 247 also near Tristan da Cunha, but at St. 254, about 10° to the west and slightly south, the surface temperature was 13·5° C. and salinity 35·14‰, which in June, when these readings were made, indicates the station is north of the Sub-Tropical Convergence.

It will be noted from these hydrological readings that increase in temperature is the best indicator of the position of the Sub-Tropical Convergence, salinity increase not always being marked.

(*c*) *South Atlantic Central Water*[1] is much warmer and more saline than Sub-Antarctic Surface Water. Its surface temperature increases from approximately 11·5° C. in winter and 14·5° C. in summer just north of the Sub-Tropical Convergence to 23° C. at the Tropical Convergence, under which it sinks along a line of discontinuity marked by the 23° C. isotherm. Its surface salinity maximum is 36‰. The maximum depth of South Atlantic Central Water is rarely more than 500 m. and is marked by a line of discontinuity with the Antarctic Intermediate layer, where the temperature is about 10·5° C. and the salinity varies between 34·85 to 35‰.

Table 13. *Stations adjacent to the Sub-Tropical Convergence*

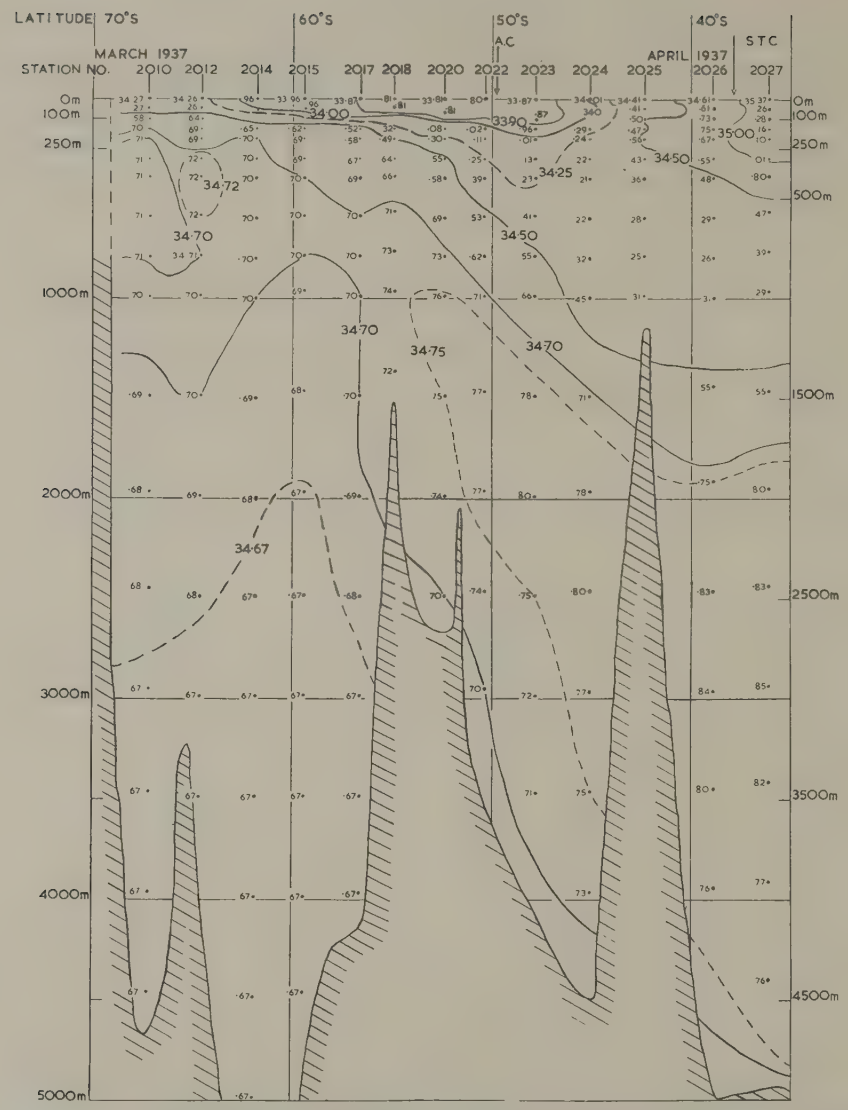
| *Date* | *Station no.* | *Temperature (° C.)* | *Salinity (‰)* | *Hydrological position* |
|---|---|---|---|---|
| 3. vi. 26 | 74 | 13·61 | 34·86 | Sub-Tropical |
| 1. vi. 26 | 72 | 12·65 | 34·67 | Close to the Sub-Tropical Convergence |
| 30. v. 26 | 71 | 10·16 | 34·37 | Sub-Antarctic |
| 30. x. 26 | 103 | 18·92 | 35·52 | Sub-Tropical |
| 4. xi. 26 | 107 | 5·91 | 34·02 | Sub-Antarctic |
| 10. x. 30 | 448 | 14·35 | 34·85 | Sub-Tropical |
| 11/12. x. 30 | 449 | 9·45 | 34·39 | Sub-Antarctic |
| 23. iv. 31 | 672 | 15·65 | 34·93 | Sub-Tropical |
| 22/23. iv. 31 | 671 | 9·70 | 34·32 | Sub-Antarctic |
| 31. x. 31 | 715 | 15·76 | 34·29 | Sub-Tropical |
| 1. xi. 31 | 716 | 10·52 | 34·31 | Sub-Antarctic |
| 2. xi. 31 | 717 | 13·28 | 35·50 | Close to the Sub-Tropical Convergence |
| 3. xi. 31 | 718 | 8·00 | 34·65 | Sub-Antarctic |
| 24. v. 36 | 1773 | 13·11 | 34·57 | Sub-Tropical |
| 25. v. 36 | 1774 | 9·40 | 34·29 | Sub-Antarctic |
| 2. iv. 37 | 2027 | 19·14 | 35·37 | Sub-Tropical |
| 1. iv. 37 | 2026 | 14·09 | 34·61 | Sub-Antarctic |
| 11/12. i. 39 | 2530 | 13·40 | 34·45 | Sub-Tropical |
| 12. i. 39 | 2531 | 11·71 | 33·43 | Sub-Antarctic |

The general movement of South Atlantic Central Water is southwards under the influence of the prevailing northerly winds. This is particularly marked in the western part of the South Atlantic where the water flows in the Brazil current. The water is deflected eastwards when the region of the West Winds is reached, and here its direction of flow is similar to that of the Sub-Antarctic Surface Water, but owing to their very different properties the two types of water remain distinct to a large extent. There is some evidence that part of the South Atlantic Central Water 'is possibly deflected southwards near the Cape of Good Hope to mix with water which turns back from the Agulhas current in an easterly direction across the Indian Ocean' (Deacon, 1937, p. 74).

The 23° C. surface isotherm on the line between the Cape Verde Islands and the Falkland Islands is situated between Sts. 710 and 711, and on the 30° W. Line between Sts. 677 and 678. Between Cape Town and the Cape Verde Islands hydrological readings were not made at all stations, and in Text-fig. 1 and all the distribution charts of species in this report, the position of the 23° C. isotherm from the 'Meteor' results (Böhnecke, 1936) has been used to indicate the location of the Tropical Convergence in the eastern Atlantic.

(*d*) *Tropical Surface Water* rarely exceeds 145 m. in depth. It has a temperature range of 23° to 29° C. from south to north, and a salinity maximum of 37‰. As noted above, it forms a marked

[1] The term 'South Atlantic Central Water', is taken from Sverdrup, Johnson and Fleming (1946); it is synonymous with Deacon's (1933) Sub-Tropical Surface Water and Sub-Tropical Under Water.

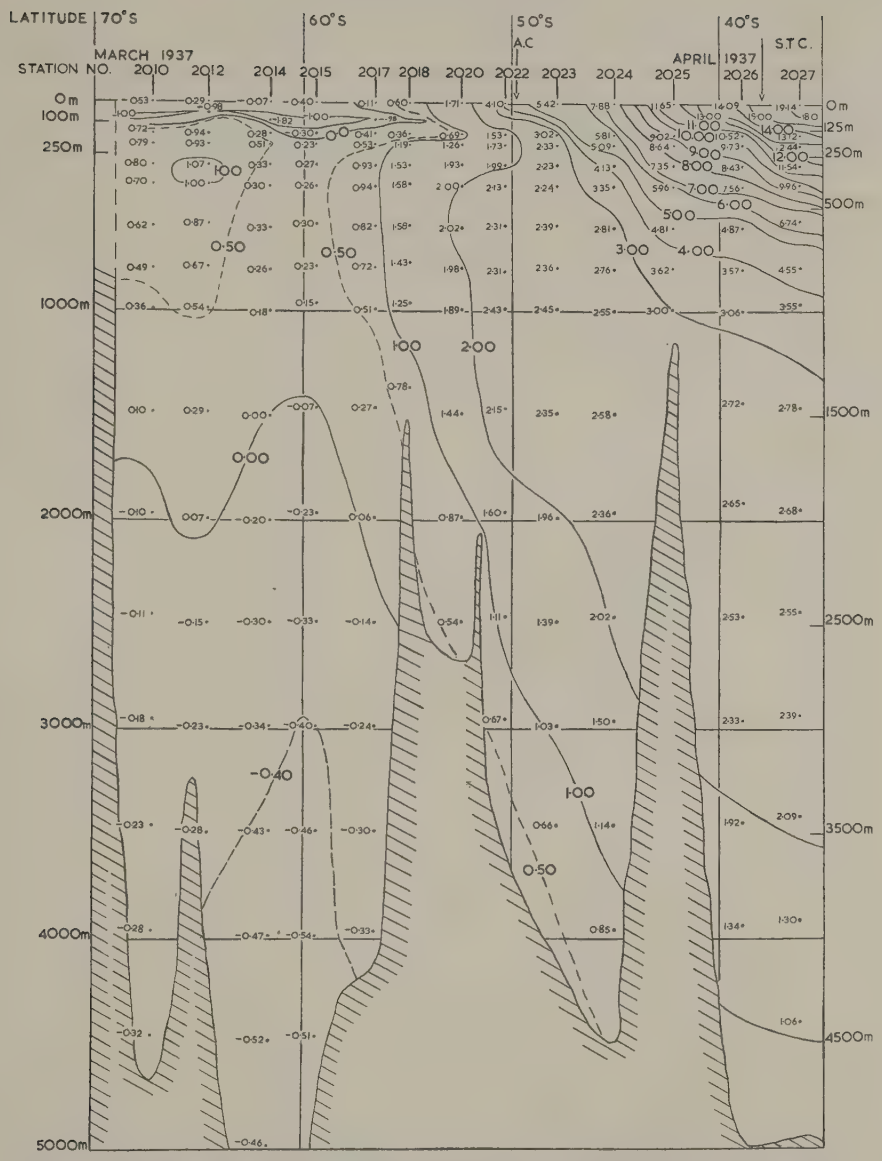



Text-fig. 19. Distribution of temperature (° C.) between 70° S. and 35° S. in the region of the Greenwich Meridian, March–April 1937 (see Text-fig. 4*a* for station positions).

discontinuity (indicated by the 23° C. isotherm) with the South Atlantic Central Water. The Tropical Convergence does not appear to have as much influence on the distribution of pelagic polychaetes as either the Antarctic or Sub-Tropical Convergences.

### (ii) INTERMEDIATE AND DEEP WATER MASSES

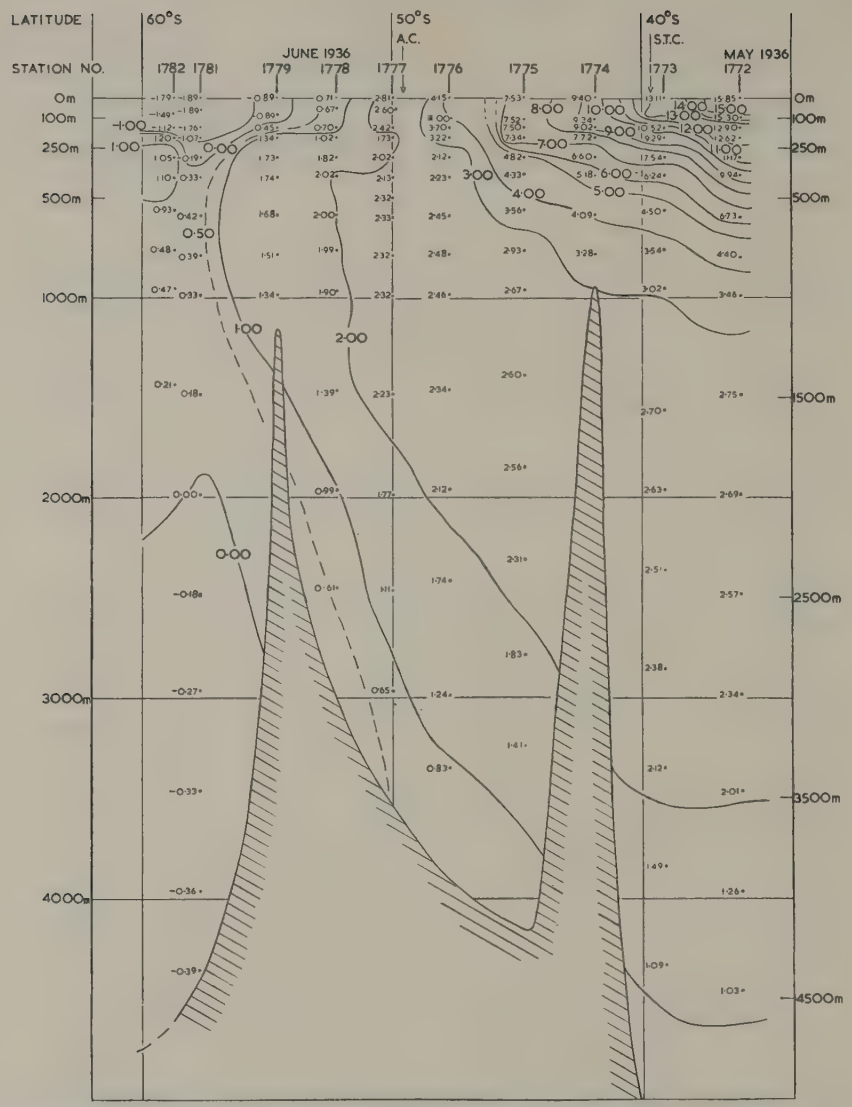
When the Antarctic Surface Water sinks at the Antarctic Convergence it mixes with water of Sub-Antarctic origin, and together with this gives rise to the north-flowing Antarctic Intermediate Water. Below the Antarctic Surface Water and Antarctic Intermediate Water throughout the South Atlantic is the Warm Deep Water with a southerly component in its movement, and beneath it the heavy Antarctic Bottom Water.




Text-fig. 20. Distribution of salinity (‰) between 70° S. and 35° S. in the region of the Greenwich Meridian, March–April 1937.

(*a*) *Antarctic Intermediate Water* has been shown by Deacon (1933) to reach a depth of about 1100 m. in latitude 45° S. increasing to 2000 m. in 30° S. and decreasing again to about 1200 m. in 5° S. along the meridian of 30° W. It is characterized by its low salinity, which at the level of minimum salinity increases from 34·15 to 34·65 ‰ between 47° S. and the Equator; the temperature increase over this distance is from 3·2° to 4·85° C.

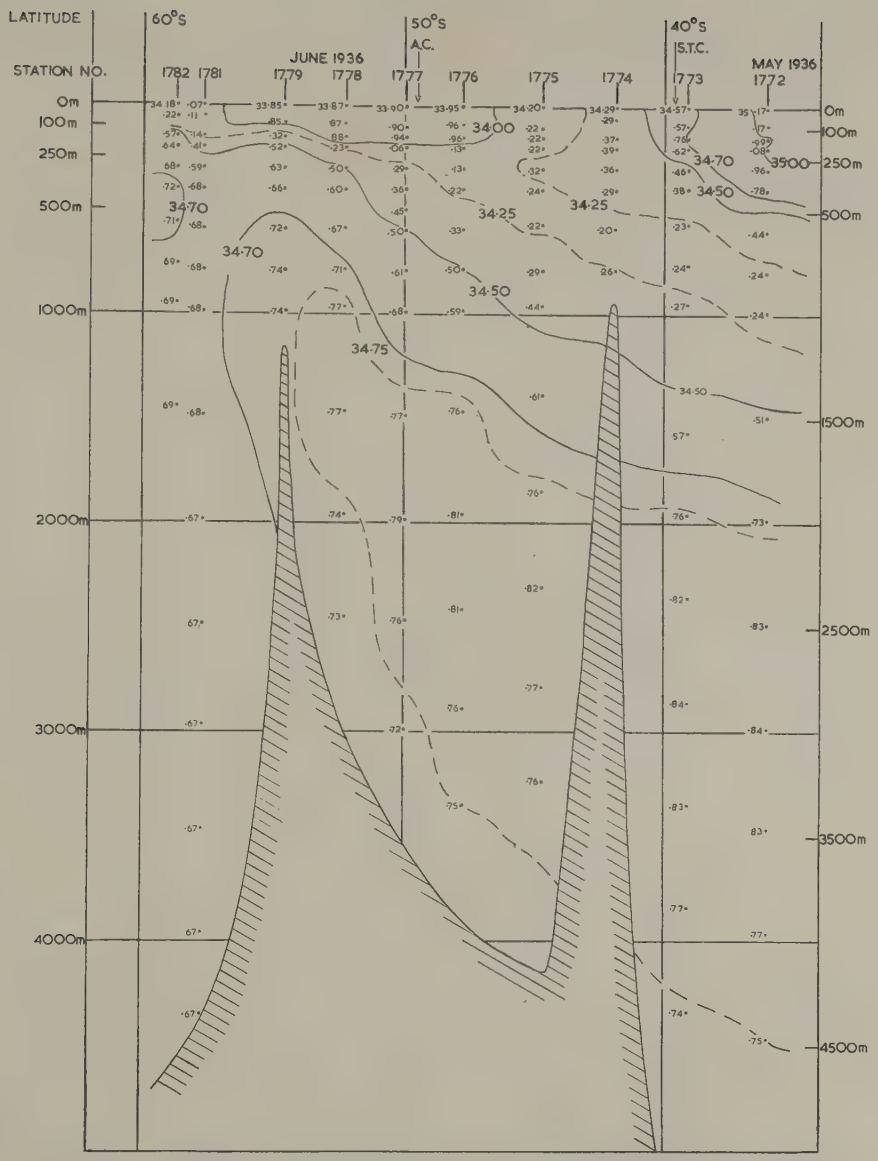
The principal direction of movement of Antarctic Intermediate Water can be seen in the temperature sections (Text-figs. 15, 17, 19, 21), in the sinking of Antarctic Surface Water at the Antarctic Convergence, where the isotherms for 2° and 3° C. between 150 and 500 m. swing markedly north. The depth of the layer has been estimated from these sections, at stations where samples were collected near the boundary between it and the Warm Deep Water. The temperature in Antarctic Intermediate




Text-fig. 21. Distribution of temperature (° C.) between 60° S. and 35° S. in the region of the Greenwich Meridian, May–June 1936 (see Text-fig. 4*b* for station positions).

Water decreases with depth to a minimum value increasing again to a maximum in the Warm Deep. The boundary between them can be taken to lie midway between these two depths (Deacon, 1933). At St. 2533 the minimum temperature in the Antarctic Intermediate water was 1·91° C. at 400 m. and the maximum temperature in the Warm Deep Layer 2·33° C. at 790 m.; the boundary at this station is therefore about 600 m. At other stations on the 0° Line the depth of the Antarctic Intermediate water was estimated in the same way and found to lie at 1620 m. at St. 2532; 900 m. at St. 2023; 1250 m. at St. 2024; 800 m. (?) at St. 1776; 1400 m. at St. 1775; 900 m. at St. 2387 and at approximately 1500 m. at St. 2386.

(*b*) *Warm Deep Water*, with its principal component of movement directed south lies below the Antarctic Intermediate Water at considerable depths in the Tropical, Sub-Tropical and Sub-Antarctic




Text-fig. 22. Distribution of salinity (‰) between 70° S. and 35° S. in the region of the Greenwich Meridian, May–June 1936.

Zones, but in the Antarctic Zone it rises steeply to within 250–100 m. of the surface. The position of its upper boundary with the Antarctic Surface and Antarctic Intermediate water has been discussed already; its lower boundary with Antarctic Bottom Water lies at depths beyond the range of any of the nets fished at the stations from which samples have been examined here.

The temperature of the Warm Deep Water decreases with depth, but its salinity increases until a maximum is reached at the core of the layer. The rise of this water close to the surface within the Antarctic Zone is very well indicated in Text-figs. 15, 17, 19, 21, by the sharp southern bend in the 2° C. isotherm between 500 and 1000 m. and in the 1° C. isotherm between 250 and 1000 m. The isohaline for 34·70‰ (Text-figs. 16, 18, 20 and 22) indicates the depth at which the core of the layer occurs and shows the sharp rise of the warm deep water to near the surface south of the Antarctic Convergence.

(*c*) *Antarctic Bottom Water* is not separated by a discontinuity layer from the Warm Deep Water and the position of the boundary between the two is difficult to estimate. None of the samples examined here was collected in this water mass.

## 2. Distribution of Species

Only the distribution of the species described in the Systematic Account is discussed in this section. This excludes a very few species inadequately described or known only from a few records. Taxonomic sequence has been retained only where this is of zoogeographical significance. The species are arranged in order of occurrence from south to north, that is from the ice-edge to the equator. Endemic antarctic polychaetes are considered first, then the cosmopolitan forms and finally the sub-tropical and tropical species.

Previous work on pelagic polychaetes in the South Atlantic Ocean has been mainly confined to material from particular zones, except for the reports by Monro (1930, 1936) on some of the Discovery Collections, and Friedrich (1950*c*) on the 'Meteor' material, both of which covered the whole area. The Deutsche Südpolar Expedition (Ehlers, 1913, 1917) and the Swedish Antarctic Expedition (Støp-Bowitz, 1951) made collections in the Antarctic and occasionally elsewhere, but other expeditions referred to in this section worked either in the Antarctic, or in the Sub-Tropical and Tropical Zones.

The wide area and numerous stations in the South Atlantic, from which I have examined material from the Discovery Collections, are shown in Text-figs. 1–4, pp. 165–7. The extensive hydrological work also carried out by the Discovery Investigations is summarized in the previous section of this report; it has enabled me to indicate, to a certain degree, the effect of variation in the hydrological environment on the distribution of the pelagic polychaetes of this area.

### *Rhynchonerella bongraini*

(Text-figs. 23–6, Tables 14 and 15, Appendices I and II)

The endemic antarctic *R. bongraini* was collected only in the top 500 m. of water, that is in Antarctic Surface Water and in the upper layers of the Warm Deep Water. The specimens varied between 4–15 mm. in length and occurred mainly in samples collected by the N 70 V net; on rare occasions it was caught by the N 100 net.

The occurrence of *R. bongraini* in the region of the Greenwich Meridian is shown both in Text-figs. 23 and 24 and in Tables 14 and 15. The temperature and salinity characteristics of the top 500 m. of water in which it occurs are shown in Text-figs. 15–21.

In this region *R. bongraini* is absent from stations immediately south of the Antarctic Convergence and its distribution in the Antarctic Surface Water seems to be controlled more by the influence of the Weddell Drift than by the position of the convergence. The existence of a boundary between Bellingshausen Sea Water and Weddell Drift has already been noted (p. 209), and *R. bongraini* was never collected to the north of this boundary.

The records of *R. bongraini* from the South Sandwich Survey have been plotted in Text-fig. 25 and listed in Appendix II, Table *b*. Nets were not fished below 250 m., so that only the Antarctic Surface Water was sampled. All the South Sandwich stations lie well within the Weddell Drift (Deacon, 1937) so that it is not surprising to find *R. bongraini* at thirty-two out of the fifty-eight stations.

The distribution of *R. bongraini* in the South Georgia area is shown in Text-fig. 26, which includes the following records:

1. The Alciopid larvae of Hardy and Gunther (1935): December–January Survey 1926–7, Sts. 124, 210–100 m. (1), WS 35, 51 m. (1), WS 36, 250–100 m. (1) and WS 112, 160–50 m. (1). Of these, I

have been able to examine only the specimen from St. 124 which is definitely *R. bongraini* but the other specimens are almost certainly the same.

2. February–March Survey 1928, Sts. WS 145, 275–100 m., (1), WS 146, 500–250 m. (1), WS 149, 250–100 m. (1), WS 190, 750–0 m. (2), and 1000–0 m. (4).

3. January–February Survey 1930, one specimen from St. 323, 250–100 m.

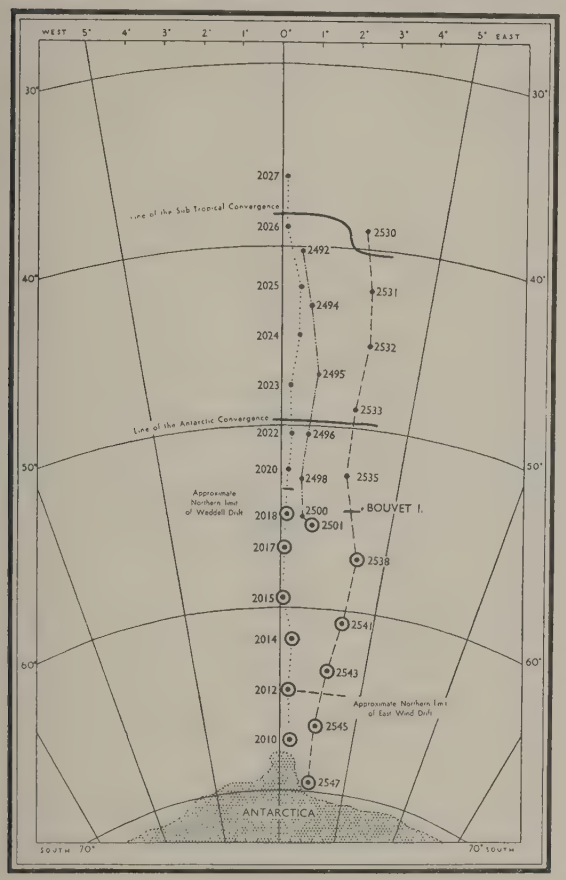



Fig. 23

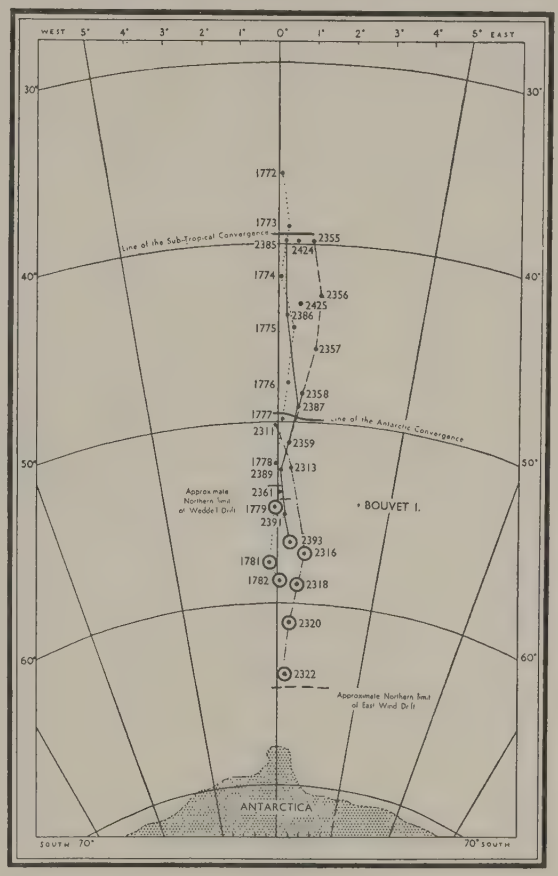



Fig. 24

Text-fig. 23. Occurrence of *Rhynchonerella bongraini* ⊙ in the region of the Greenwich Meridian. Sts. 2010–27, March–April 1937; Sts. 2492–2501, November–December 1938; Sts. 2530–47, January 1939, N 70 V nets.

Text-fig. 24. Occurrence of *Rhynchonerella bongraini* ⊙ in the region of the Greenwich Meridian. Sts. 1772–82, May–June 1936; Sts. 2311–22, April 1938; Sts. 2355–61, 2385–93, 2424 and 2425, July–September 1938, N 70 V nets.

The sparseness of this distribution is in marked contrast to that found on the Greenwich Meridian and around the South Sandwich Islands; this is particularly true of the top 50 m. of water. Disregarding the catches at St. WS 190, where the nets were hauled from 1000 and 750 m. to the surface, there is no record from 50–0 m., and only one specimen was caught by a net hauled between 100 and 50 m., at St. WS 35, which, as shown by Hardy and Gunther (1935, fig. 41) fished in Weddell Sea Water. At St. WS 112 (160–50 m.), the specimen may have been taken in Warm Deep Water at the lowest part of the haul, but if it was collected at the top of the haul, it would also have been taken in Weddell Sea Water.

The remaining records of *R. bongraini* from the South Georgia Survey are from the upper layers of Warm Deep Water, some of them north of the northern limit of Weddell Drift, and it is not unlikely that this species inhabits this layer to the north, as far as the Antarctic Convergence.

Table 14. Rhynchonerella bongraini. *Distribution in the region of the Greenwich Meridian, between 64° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*

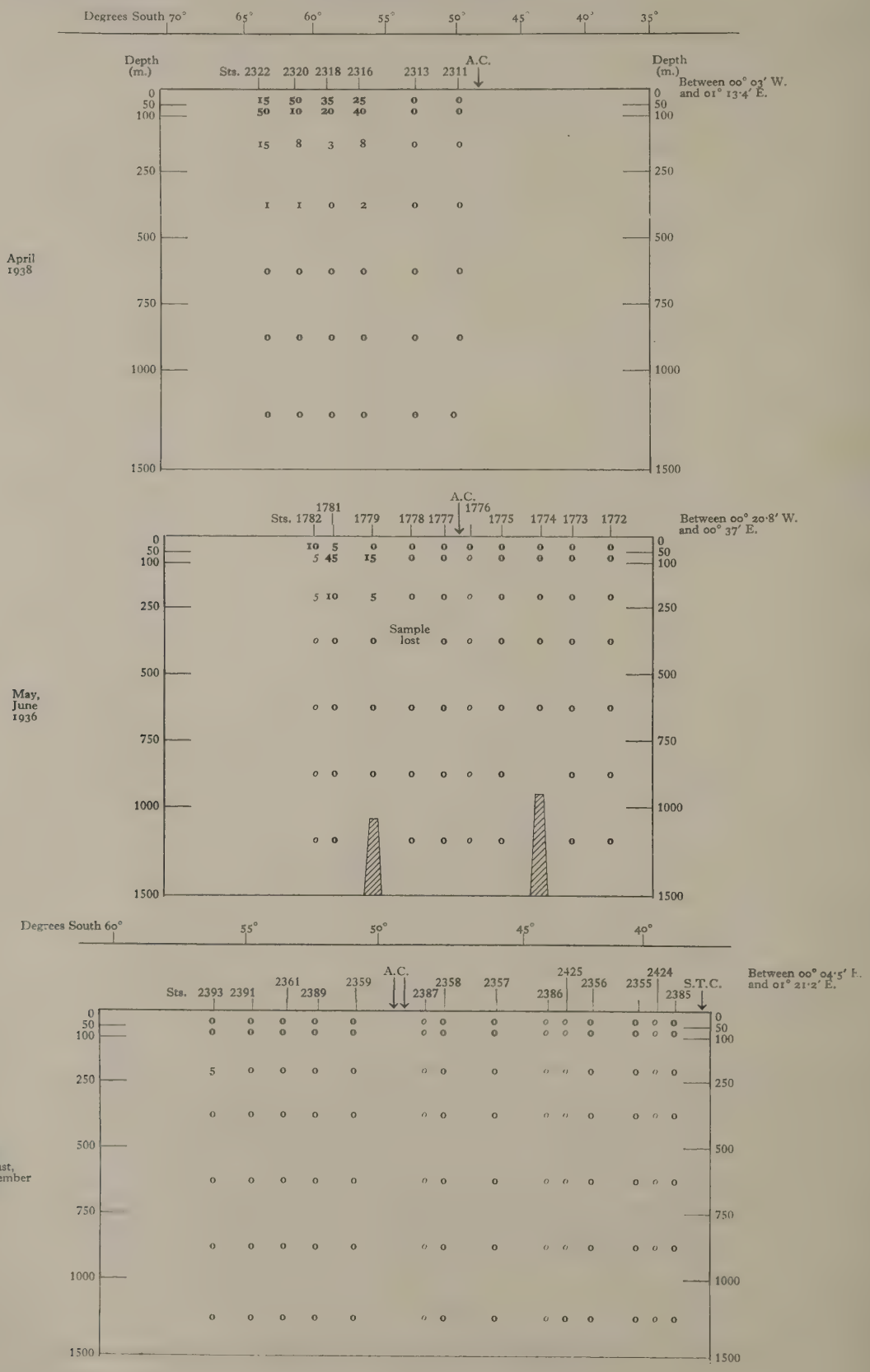
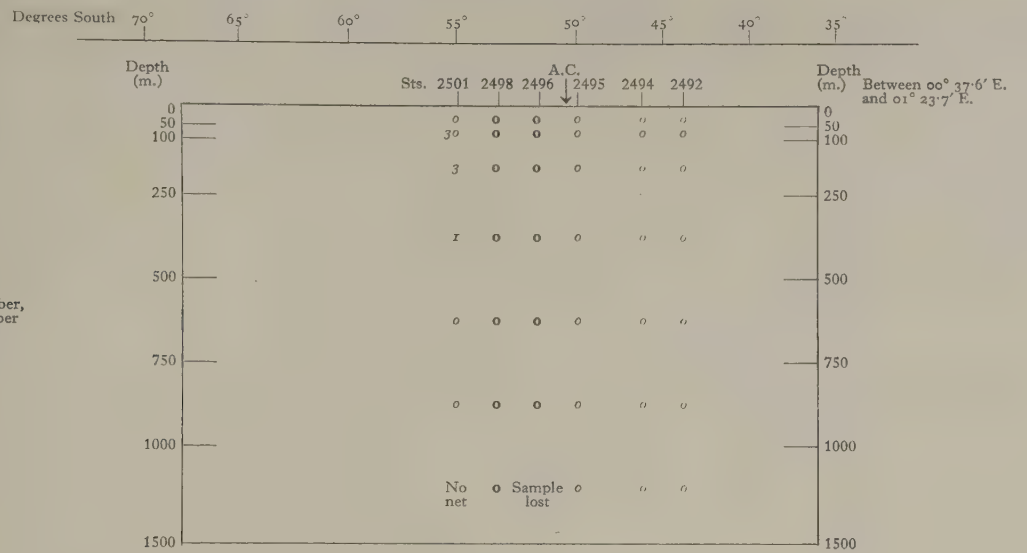
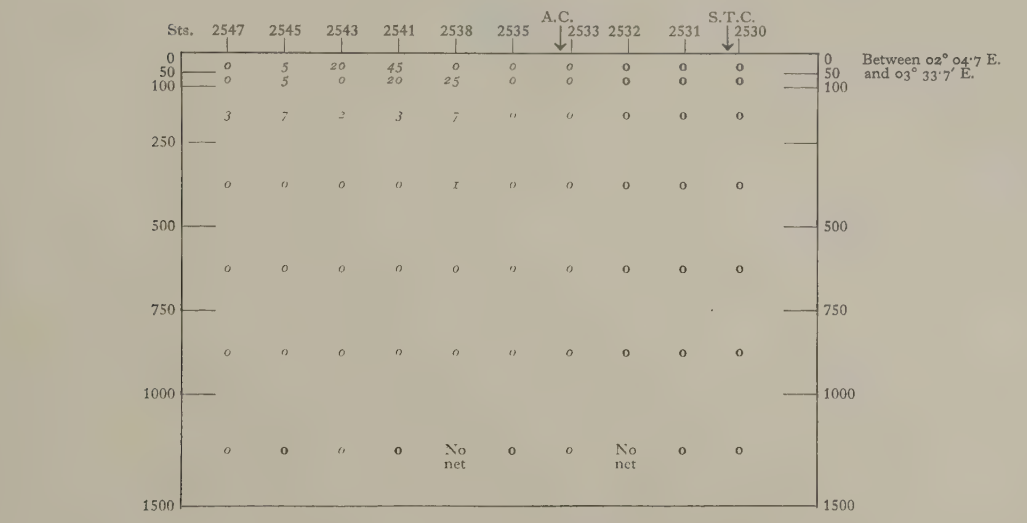


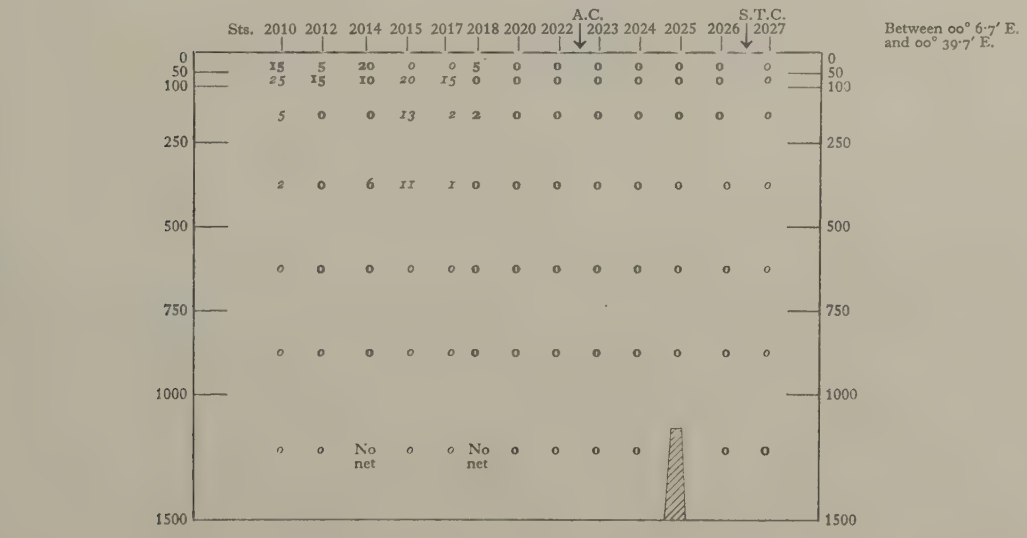
Table 15. Rhynchonerella bongraini. *Distribution in the region of the Greenwich Meridian, between 70° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*




November, December 1938



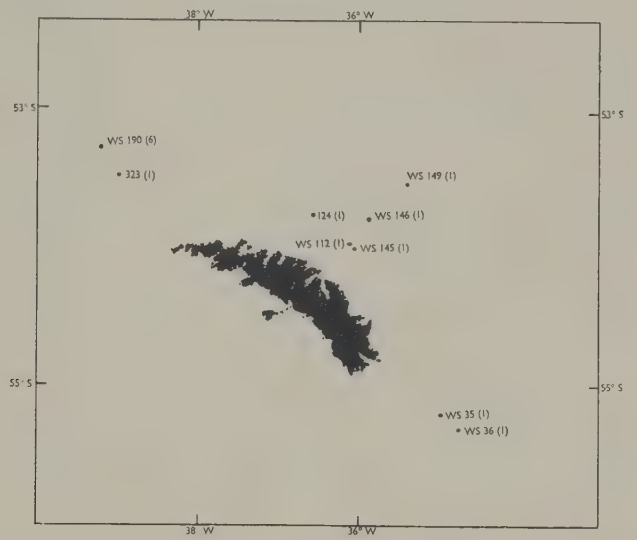

January 1939




March, April 1937

Text-fig. 25. Occurrence of *Rhynchonerella bongraini* round the South Sandwich Islands and in the Weddell Sea (see also Text-figs. 23, 24 and 26, Tables 14, 15).

Samples from N 70 V nets, other than those along the 0° Line and around South Georgia and the South Sandwich Islands, were not extensively examined. Only four miscellaneous records of *R. bongraini* are reported here. These are from St. 12, N 70 V, 500–250 m. (1); St. 2296, N 70 B, 240–110 m. (3); St. 2300, N 100 B, 350–200 m. (1); St. 2322, N 100 H, 5–0 m. (1), and have been plotted in Text-fig. 25. They confirm the suggestions made above. At St. 2322 the species was collected in the Weddell Drift and the other records are from the upper layers of the Warm Deep Water. The surface position of St. 12 was outside the influence of Weddell Drift and the net which collected *R. bongraini* there fished in the Warm Deep Water.




Text-fig. 26. Occurrence of *Rhynchonerella bongraini* round South Georgia, December–January 1926–7, February–March 1928, and January–February 1930, N 70 V nets. Number of specimens at each station in brackets.

*Previous records*. The only published records of *R. bongraini* from about the Greenwich Meridian are those made between 1927 and 1931 by the Norwegian Antarctic Expedition (Støp-Bowitz, 1949), which collected the species at twelve stations, all south of the northern limit of Weddell Drift, from hauls made between 400 m. and the surface.

In 1930 Monro reported *R. bongraini* from around the South Sandwich Islands at Sts. SS 33 and SS 53, as *R. fulgens*, and in 1936 from St. WS 555 as *Callizonella bongraini*. Støp-Bowitz (1949) reported this species (as *Krohnia bongraini*) from 57° 48′ S., 26° 25′ W., in a net hauled between 400 and 300 m.

Apart from Hardy and Gunther's (1935) records of *Rhynchonerella bongraini* as 'Alciopid larvae' discussed on page 192, this species has previously been reported from South Georgia only by the Swedish Antarctic Expedition, 1901–3 (Støp-Bowitz, 1951). No details of depth are given for this record.

Augener (1929) reported *R. bongraini* (as *Callizonella bongraini*) from fifteen stations made in the Weddell Sea, between 450 m. and the surface, by the Deutsche Südpolar Expedition, 1911–12. On the Norwegian Antarctic Expedition of 1927–31 it was collected at 59° 59′ S., 45° 18′ W. between 100–200 m., and at 58° 09′ S., 37° 38′ W. between 300 and 200 m. (Støp-Bowitz, 1949), apart from the records already noted. The Swedish Antarctic Expedition, 1901–3, also collected this species at four other stations in the Antarctic zone, with nets fishing between 700 m. and the surface (Støp-Bowitz, 1951). These records support my suggestions on the distribution of *R. bongraini* as far as the information given with them allows.

### *Vanadis antarctica* and *Vanadis longissima*

(Text-fig. 27, Appendix II)

*V. antarctica*, collected only to the south of the Antarctic Convergence, and *V. longissima*, collected only to the north of this boundary, are considered here together, because they may represent geographical races of one species. Both species are large and were collected only by the N 100 and TYF nets.

Of the *V. antarctica* hauls, all but two were made in the Antarctic Surface Water and only the specimen, from St. 1936, was collected north of the influence of Weddell Drift. *V. longissima* also occurred mainly in the top layers of water, but at St. 2636 one specimen was probably taken in the Antarctic Intermediate Current.

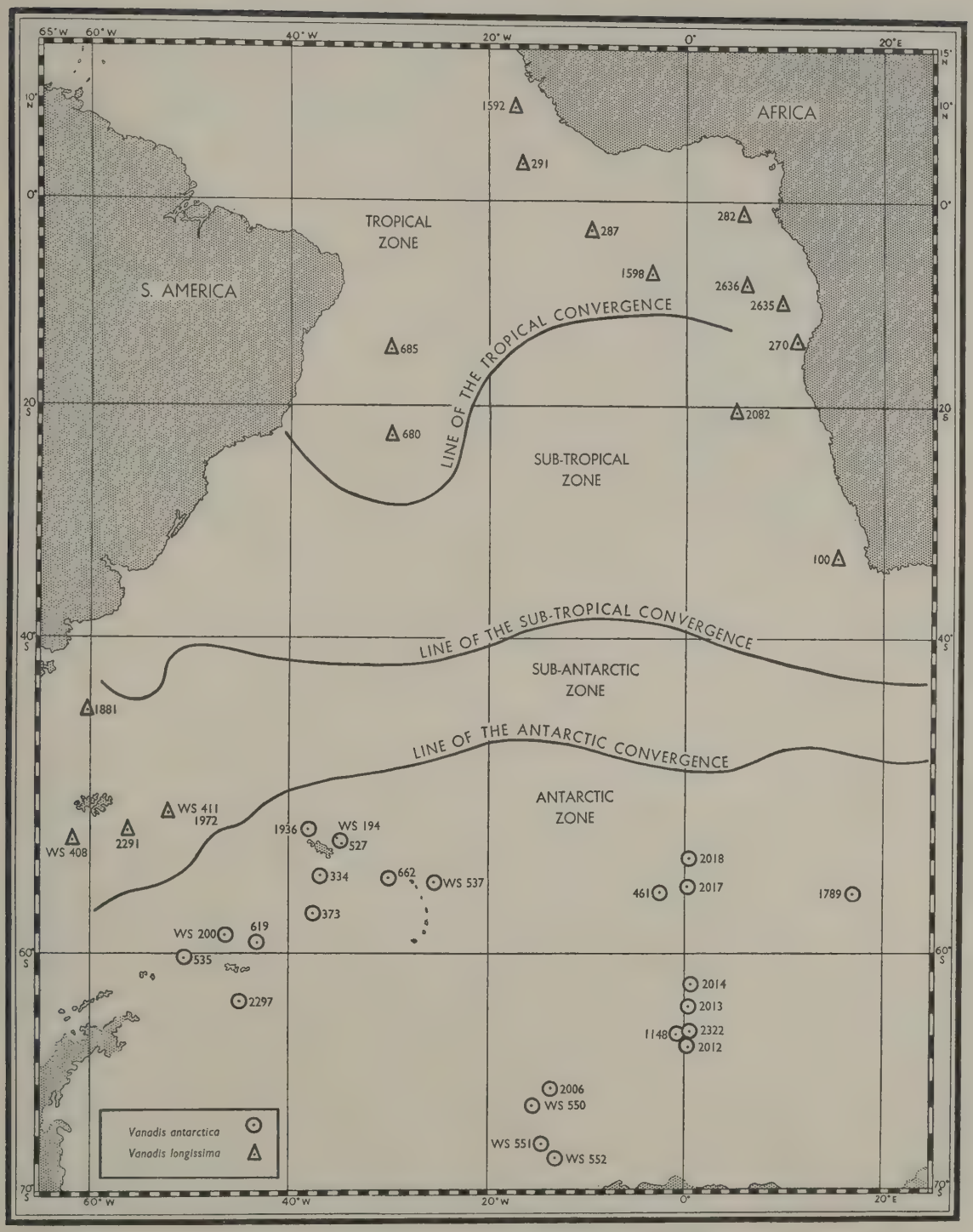
The very close morphological similarity between *V. antarctica* and *V. longissima* and the possibility that they are separated in distribution at the surface by the Antarctic Convergence makes it tenable that they are cold and warm water forms of one species, the cold form inhabiting the Antarctic Zone and the warm the Sub-Antarctic, Sub-Tropical and Tropical Zones. Moreover it is possible that they are not isolated from one another in the deeper Antarctic Intermediate Layer or in the Warm Deep Water, but mix freely in the region of the Antarctic Convergence and are carried to their respective surface habitats by the movements of the water masses. Both species could be carried south in the Warm Deep Water, *V. antarctica* could circulate northwards in the Antarctic Surface Water and *V. longissima* northwards in the Antarctic Intermediate Water (Text-fig. 14, p. 207). Clearly, however, not only are more records required from depth in the Antarctic and Sub-Antarctic Zones to indicate the relative densities of the circumpolar populations of both, but the reproductive habits of the species must be investigated before the many problems of the *V. longissima-V. antarctica* complex can be satisfactorily solved.

*Previous records.* Within the Atlantic sector of the Antarctic the only records of *V. antarctica* north of the Antarctic Convergence are from Monro (1936), from Sts. WS 408 and WS 411. I have re-examined these specimens and consider them to be *V. longissima*. The Swedish Antarctic Expedition collected one specimen of *V. antarctica* at 69° 51′ S., 49° 37′ W., from a net hauled to the surface from 200 m. (Støp-Bowitz, 1951). Baker (1954) reported numerous specimens of *V. antarctica* from the 100-0 m. 'Discovery' samples within the Atlantic sector of the Antarctic and also demonstrated the circumpolar continuity of the species between these depths. *V. longissima* was reported by Apstein (1900) from the South Atlantic at three stations between 3° S., 13° W., and 2° S., 26° W., and by Monro (1930) from Sts. 287 and 291.

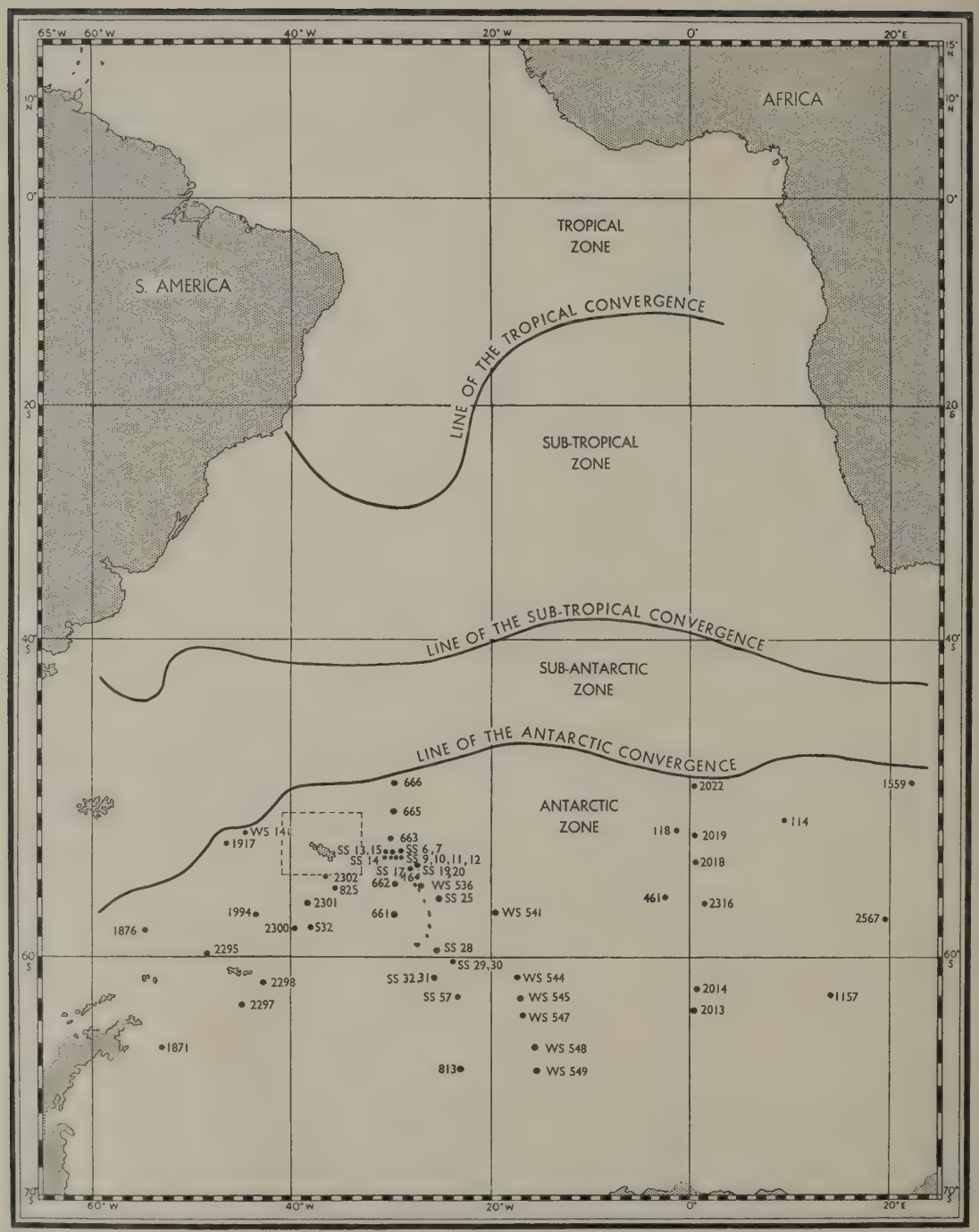
### *Tomopteris carpenteri*

(Text-figs. 28–30, Appendices I and II)

The endemic antarctic *T. carpenteri* was collected in all water masses at all explored depths within the Antarctic Zone. This species measures up to 70 mm. in length and occurred mainly in the larger nets. However, in N 70 V samples from the South Georgia Surveys, there were numerous small specimens of *T. carpenteri* less than 12 mm. in length. These include the smallest specimens of the species ever collected, and I refer to them here as *juveniles*. All other specimens, none of which measures less than 15 mm., I have defined as *adult*. This purely arbitrary definition serves to separate the material into two groups. Recognition of maturity in the Tomopteridae depends on the presence of sexual products in the parapodial pinnules, and unfortunately in many of the largest preserved specimens of *T. carpenteri* these are not visible.




Text-fig. 27. Occurrence of *Vanadis antarctica* and *V. longissima*.




Text-fig. 28. Occurrence of *Tomopteris carpenteri*. All specimens adult except at St. WS 141 (see also Text-figs. 29, 30.)

The records of adult *T. carpenteri* [Text-figs. 28 (except St. WS 141) and 29] confirm the known distribution of the species; it has never been reported north of the Antarctic Convergence,[1] and is widely distributed in the Antarctic Surface Water and occurs also in the Warm Deep Water.

Juvenile specimens of *T. carpenteri* were collected only around South Georgia [Text-fig. 28 at St. WS 141 and Text-fig. 30, Appendix I (Tables *a* and *b*)] in January, February and March, at all depths from 750 m. to the surface. Although the N 70 nets were hauled extensively on the Greenwich Meridian and in the South Sandwich Surveys, juvenile *T. carpenteri* were never collected in either area. There can be little doubt that if juvenile *T. carpenteri* had occurred about the Greenwich

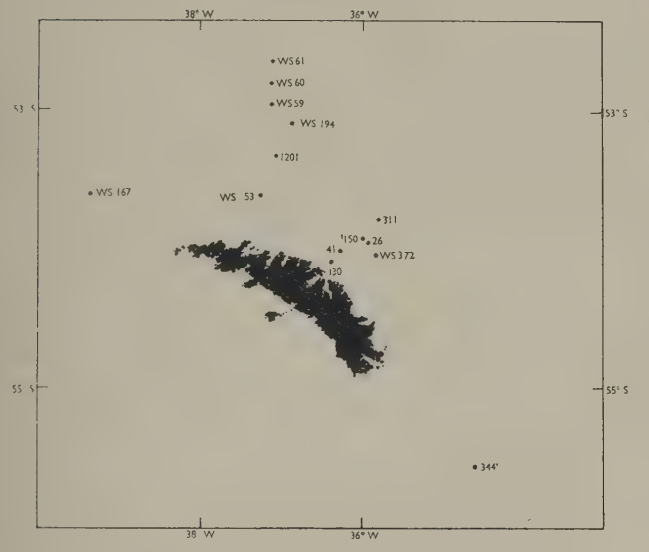



Fig. 29

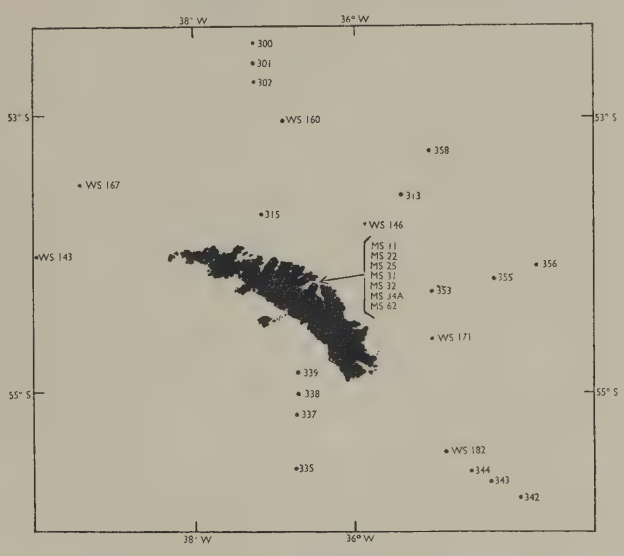



Fig. 30

Text-figs. 29 and 30. Occurrence of *Tomopteris carpenteri* round South Georgia. Fig. 29. Adults. Fig. 30. Juveniles.

Meridian, they would have been picked up by the N 70 V nets, because specimens of *T. planktonis* and *T. septentrionalis* within the same size range were collected there and also round South Georgia. However, the numerous records of '*Tomopteris* unidentifiable' listed in Appendix I from South Georgia and the 0° Line must be considered. I do not regard any of these as young *T. carpenteri*, but they are listed as unidentifiable because I cannot decide if they are *T. septentrionalis* or *T. planktonis*.[2] The principal diagnostic characters of these last two species (the diffuse chromophil and hyaline glands), have been destroyed in all the specimens not identified. In juvenile *T. carpenteri* however, the hyaline gland is dorsal on the parapodial pinnule and has escaped destruction affecting the apical region. I suggest that *T. carpenteri* may breed around South Georgia but not in the open ocean.

*Previous records.* Juvenile specimens of *T. carpenteri* have previously been collected only by the 'Norwegica' but not from the Atlantic Ocean, Støp-Bowitz (1949) reporting three specimens from the Pacific at 67° 30′ S., 91° 33′ W., 50–0 m., and 66° 48′ S., 79° 56′ W., 100–50 m. Monro (1930) recorded eleven juvenile specimens from seven Marine Station shallow hauls made in Cumberland Bay, South Georgia, as either *T. carpenteri* or *T. planktonis*. I have examined them and find them all to be *carpenteri*. Considering the large collections which have been made in the Antarctic Zone of

[1] Except by McIntosh (1925); as noted on p. 175 this record is probably *T. nisseni*.

[2] Theoretically it is possible that there are also several other species of the same size range including *T. cavalli* (see pp. 173–174).

the Southern Oceans this distribution is very sparse and it will be of interest to note how future collecting will contribute to our knowledge of the distribution of juvenile *T. carpenteri*.

The original record of *T. carpenteri* (adult) was made by Quatrefages (1865) from 60° 3′ S., 0° 6′ E. Since then the adult has frequently been reported from the Atlantic sector of the Antarctic. In earlier Discovery reports Monro (1930, 1936) recorded it from South Georgia, the South Sandwich Islands and numerous localities scattered throughout the area, and Hardy and Gunther (1935) also reported it from South Georgia. The 'Norwegica' collected the species near Bouvet Island and the South Sandwich Islands (Støp-Bowitz, 1949) and the Swedish Antarctic Expedition collected it near the South Orkneys (Støp-Bowitz, 1951).

### *Tomopteris planktonis* and *Tomopteris septentrionalis*

(Text-figs. 31–3, Appendices I and II)

*T. planktonis* and *T. septentrionalis* are the only known cosmopolitan tomopterids and have been found in all explored water masses in the South Atlantic Ocean. *T. planktonis* (size range 2–10 mm.) was collected principally by the N 70 net but occurred also in all other nets except the N 450. *T. septentrionalis* measures up to 15 mm. in length and was caught frequently by all the nets.

*T. septentrionalis* was caught more often by the larger nets than *T. planktonis*, therefore some points about their distribution must be emphasized or they may be misinterpreted. In addition the larger number of '*Tomopteris unidentifiable*' listed in Appendix I, which, as noted on p. 227 are probably either *T. planktonis* or *T. septentrionalis*, must also be considered.

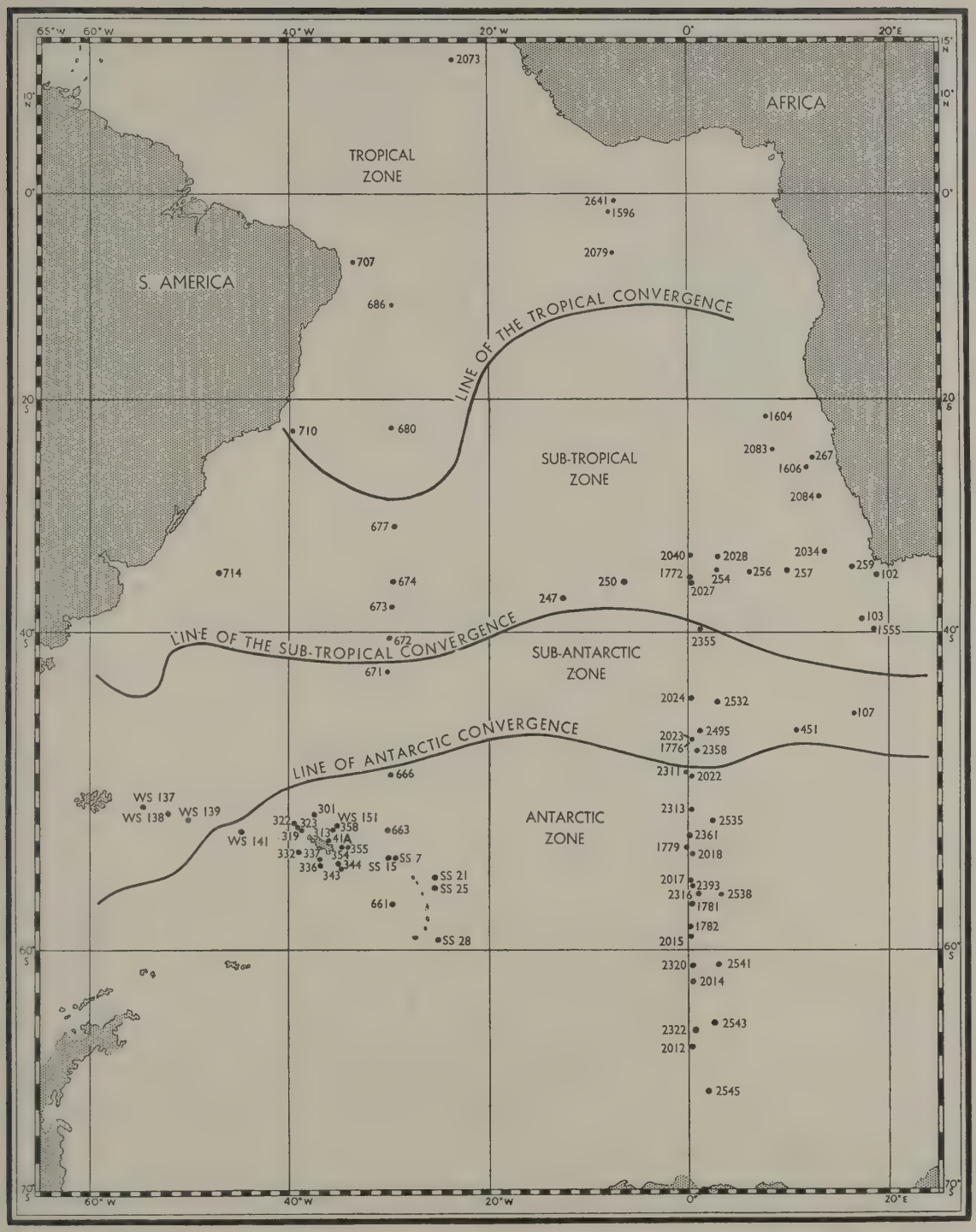
(*a*) Around South Georgia both species were frequently taken in the Warm Deep Water, but a few exceptions (five of *T. planktonis* and one of *T. septentrionalis*), together with the fourteen '*Tomopteris unidentifiable*', were collected outside this water mass. Additional samples around South Georgia may show either that both species inhabit Antarctic Surface Water and Warm Deep Water, or that one of them inhabits the Warm Deep layer only.

(*b*) In the vicinity of the Greenwich Meridian, *T. septentrionalis* was caught more often by the N 100 B nets than *T. planktonis* which, however, appears to be equally well distributed there, because it was caught more often by the N 70 V nets, which explored a greater depth range.

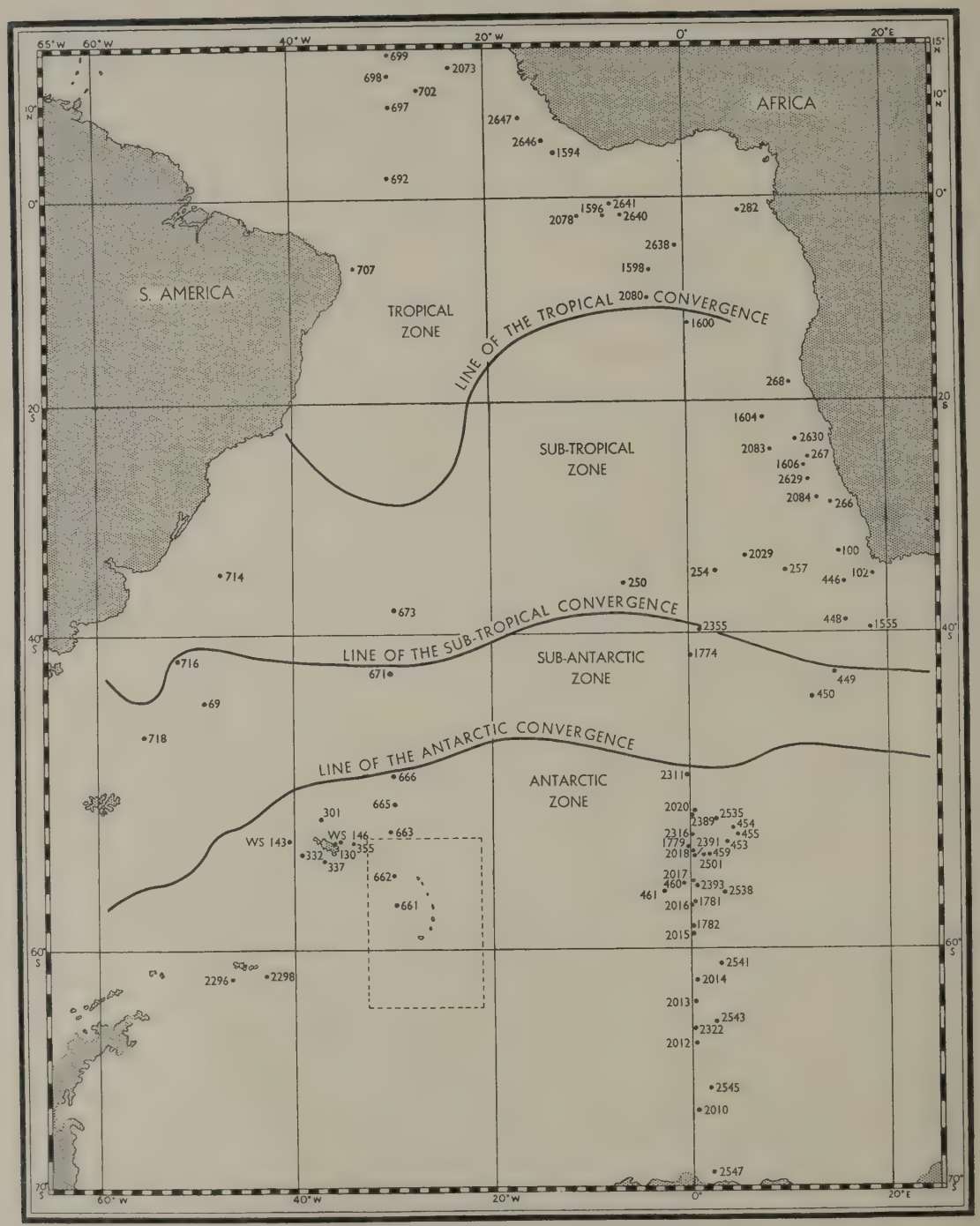
(*c*) In the South Sandwich survey *T. septentrionalis* was collected fifty-five times, of which forty-five were by the towed nets (Text-fig. 33), but *T. planktonis* was caught only on five occasions, of which three were with towed nets (Text-fig. 31). *T. septentrionalis* is not necessarily more abundant than *T. planktonis* in this region, but the type of net may not have been so favourable for catching the latter species.

*Previous records.* *T. planktonis* has been widely reported from the South Atlantic Ocean. In the Antarctic Zone it was reported by Augener (1929) from the Weddell Sea, by Monro (1930, as *T. carpenteri*) from St. SS 21, and by Støp-Bowitz (1949, 1951) from Bouvet Island, the South Sandwich Islands and South Georgia. The records of *T. planktonis* in the present work appear to be the first from the Sub-Antarctic Zone. In the Sub-Tropical and Tropical Zones, Apstein (1900) reported it west and north of Ascension Island, and Monro (1936) from 'Discovery' stations between the Cape Verde Islands and the Falkland Islands.

*T. septentrionalis* was reported by Augener (1929) from the Weddell Sea, by Monro (1930) from South Georgia and the South Sandwich Islands, by Hardy and Gunther (1935) from South Georgia, by Monro (1936) from 'Discovery' stations scattered throughout the Antarctic Zone and by Støp-Bowitz (1949, 1951) at numerous localities between 10° E. and South Georgia. There appear to be



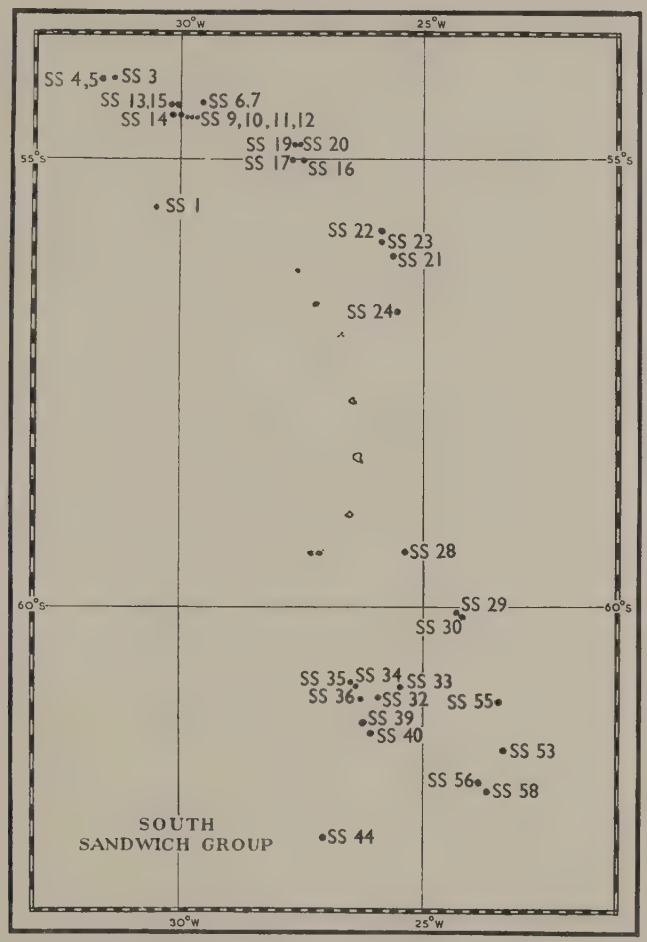

Text-fig. 31. Occurrence of *Tomopteris planktonis*.




Text-fig. 32. Occurrence of *Tomopteris septentrionalis* (see also Text-fig. 33).

no previous records of *T. septentrionalis* from the Sub-Antarctic, other than those reported by Monro (1936) from 'Discovery' Sts. 450 and 449, and he also recorded it in abundance from the Sub-Tropical and Tropical Zones. Støp-Bowitz (1951) reported it off the coast of Brazil.

Both *T. planktonis* and *T. septentrionalis* were probably present in the 'Meteor' collections from the South Atlantic, reported by Friedrich (1950*c*) as Tomopteridae.




Text-fig. 33. Occurrence of *Tomopteris septentrionalis* round the South Sandwich Islands.

## *Typhloscolex mülleri*

(Text-figs. 34, 35, 36; Tables 16 and 17, Appendices I and II)

The cosmopolitan *T. mülleri* was collected in all explored water masses of the South Atlantic except in the Antarctic Zone where it appears mainly in the Warm Deep Water; it occurs in Antarctic Surface Water only south of the northern limit of Weddell Drift. This species is small, rarely measuring more than 7 mm. in length and was caught mainly by the N 70 nets.

In the South Georgia Surveys, *T. mülleri* was caught by eleven nets in February–March 1928, nine times between 1000 and 250 m. and once in each of the 250–100 and 100–50 m. nets[1] (Text-fig. 34). In January–February 1930, no catches were made above 100 m., but six were made by nets

[1] Disregarding the catches made at St. WS 190 where the nets from 1000 and 750 m. did not close.

Table 16. Typhloscolex mülleri. *Distribution in the region of the Greenwich Meridian, between 64° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*

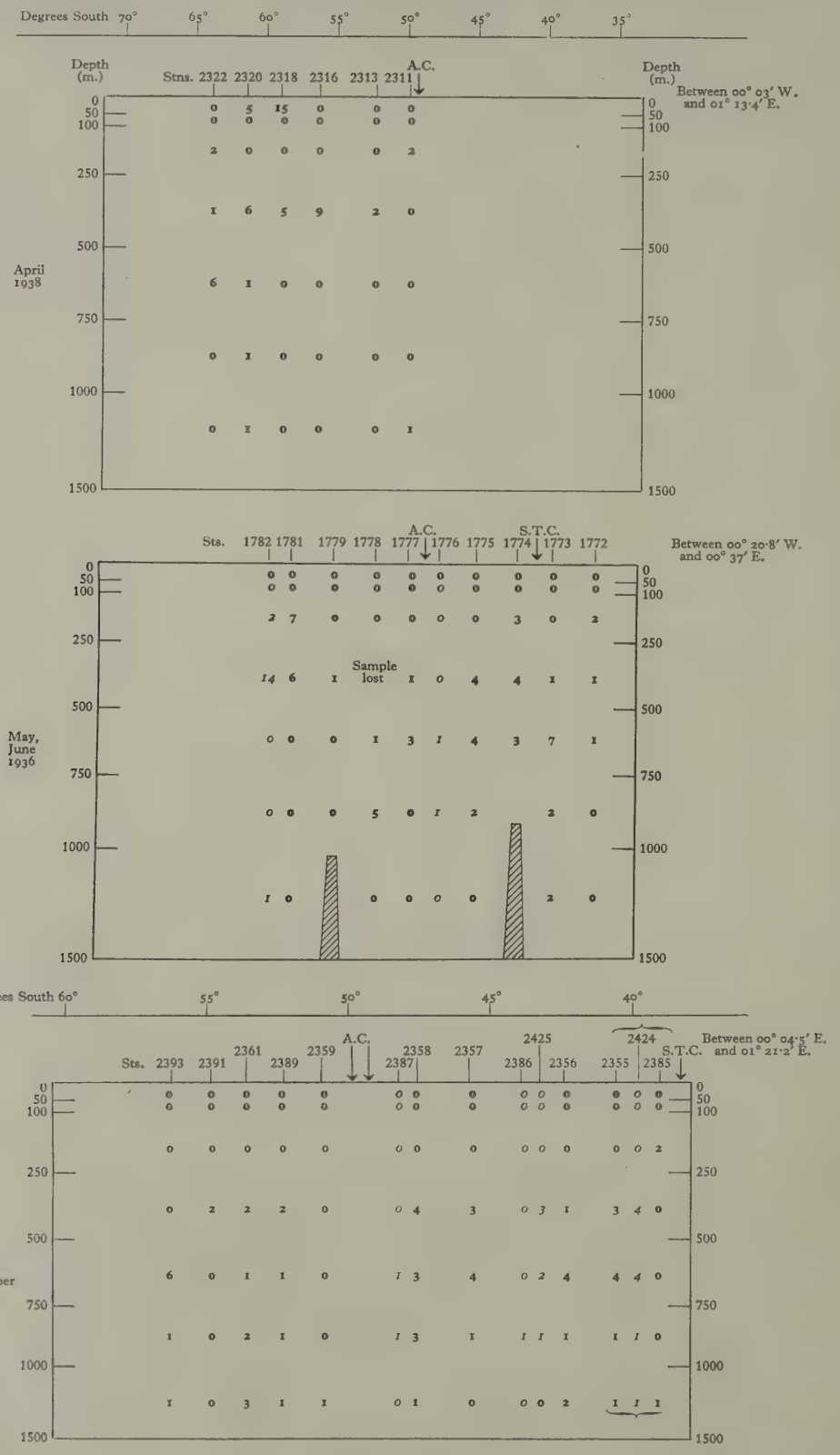
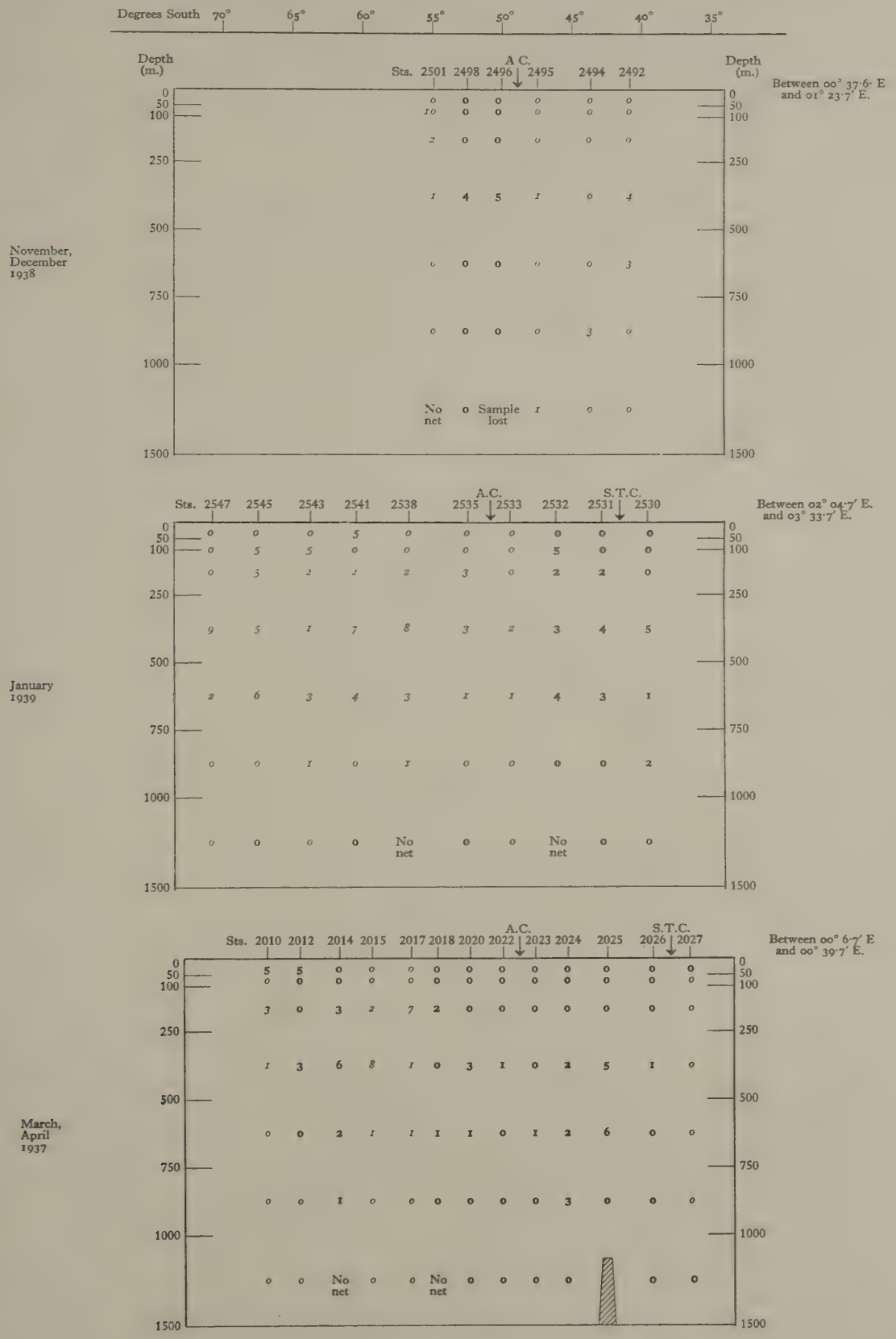


Table 17. Typhloscolex mülleri. *Distribution in the region of the Greenwich Meridian, between 70° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*



hauled between 250–100 m. and twenty-two from nets hauled between 1000 and 250 m. (Text-fig. 35). Hardy and Gunther (1935) reported it altogether nineteen times from the December–January Survey, 1926–7, in sixteen nets hauled between 1000 and 250 m. and the remainder from nets closing at 100 m.

The combined results of these three surveys show that the species was collected once in Antarctic Surface Water, in the 100–50 m. nets, nine times in the nets hauled between 250 and 100 m. which fished in Antarctic Surface Water and Warm Deep Water, and thirty-one times by the nets which were hauled in the Warm Deep Water between 1000 and 250 m. These suggest that around South Georgia, *T. mülleri* is essentially a Warm Deep Water species.

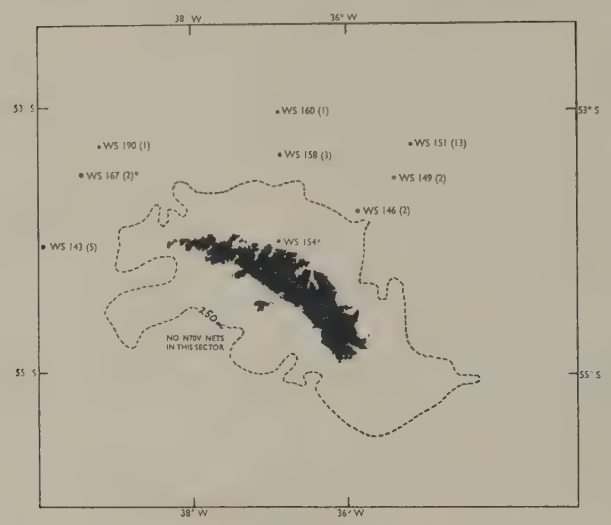



Fig. 34

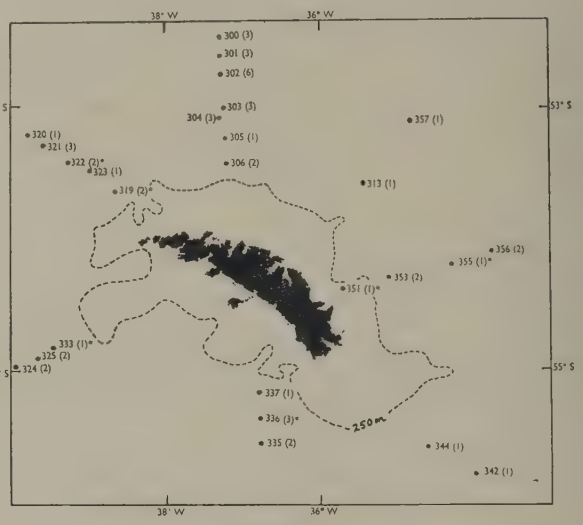
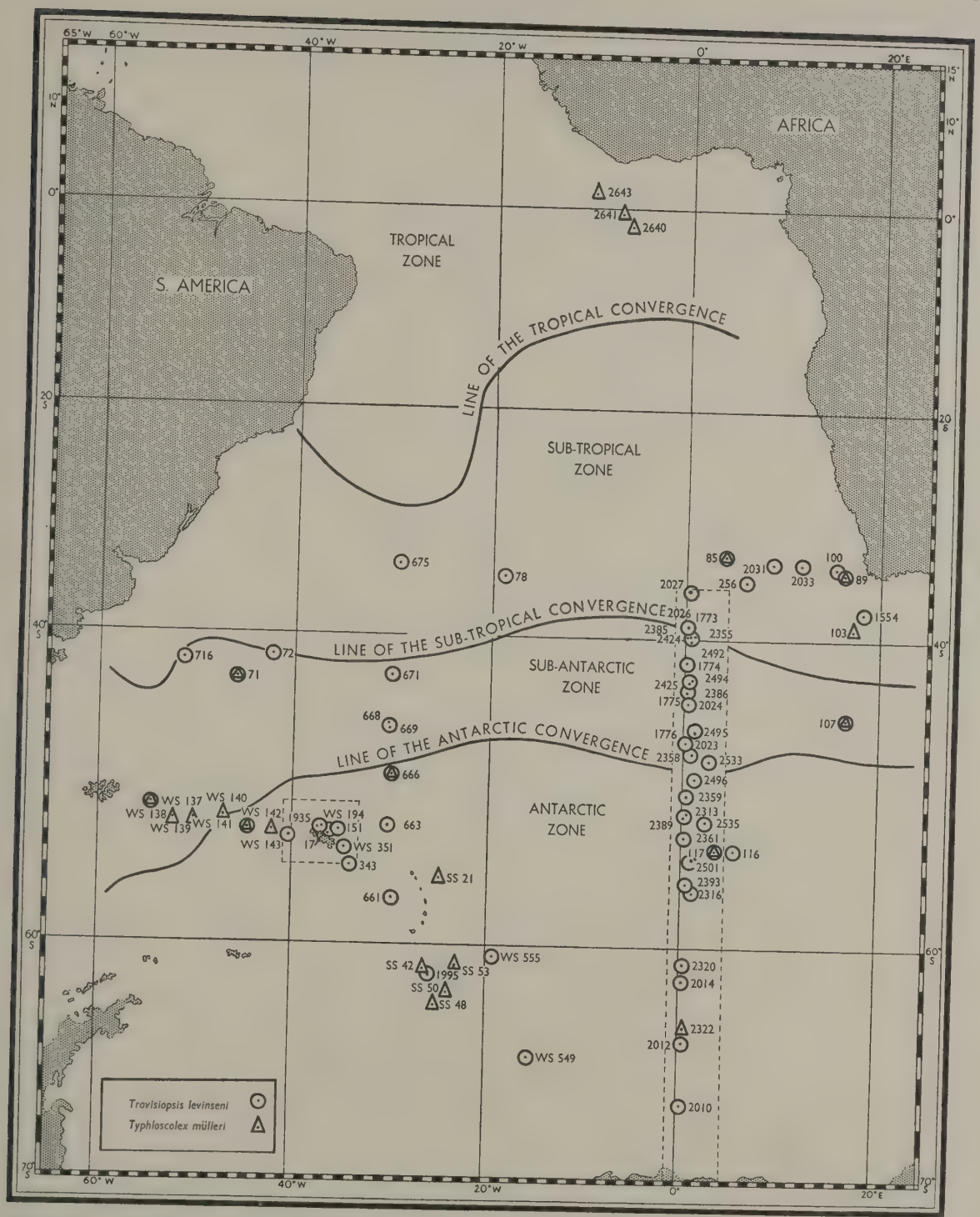



Fig. 35

Text-figs. 34 and 35. Occurrence of *Typhloscolex mülleri* round South Georgia. N 70 V nets, 1000–250 m. Number of specimens at each station in brackets. * = one at 100–50 m. † = two at 100–250 m. Fig. 34. February–March 1928. Fig. 35. January–February 1930.

The occurrence of *T. mülleri* in the region of the Greenwich Meridian is shown both in Text-figs. 4*a* and *b* (p. 167) and in Tables 17 and 18. It occurred at all stations made in this area, except St. 2027.

*T. mülleri* was never caught in very large numbers about the Greenwich Meridian, but nevertheless it was collected with marked regularity at certain depths, particularly between 1000 and 250 m. In January 1939, it occurred in all nets fished between 750 and 250 m. and in general at stations in the Antarctic Zone it was taken fairly regularly in the Warm Deep Water. In contrast to the South Georgia area where it was largely confined to the Warm Deep Water, on the Greenwich Meridian it occasionally occurred in the summer months in some number in the surface layer. Nine catches of *T. mülleri* were made in Antarctic Surface Water, south of the northern limit of Weddell Drift, indicating that possibly the species migrates upwards into Weddell Sea Water at this season. In winter, on the contrary, the collections along the Greenwich Meridian indicate that *T. mülleri* leaves the top 250 m. of water and is more concentrated between 500 and 1500 m. than in the summer. Between November and April, for example, thirteen successful hauls out of twenty-three were made between 250–100 m. and seven successful hauls out of forty-one hauled between 1500–750 m. In the May–September collections, however, the situation is reversed with one successful haul out of nine between 250–100 m., but with eight out of seventeen collections in between 1500 and 750 m.




Text-fig. 36. Occurrence of *Typhloscolex mülleri* and *Travisiopsis levinseni* (see also Text-figs. 34, 35; and Tables 16, 17).

In the Sub-Antarctic Zone, *T. mülleri* is concentrated along the Greenwich Meridian between 100 and 750 m. in summer, but is found in the deeper layers, between 250 and 1500 m. in winter, within Sub-Antarctic Surface Water, Antarctic Intermediate Water and Warm Deep Water.

*T. mülleri* was collected at five stations in the South Sandwich Survey (Text-fig. 36, Appendix II, Table *b*); at three of these stations the nets fished in the Warm Deep Water and at the other two in Weddell Sea Water.

Miscellaneous records of *Typhloscolex mülleri* (Text-fig. 36), include no catches from Antarctic Surface Water, north of the northern limit of Weddell Drift, but elsewhere there are records from all explored water masses. The absence of *T. mülleri* to the west of, and between Sts. 85 and 2640 is probably of no significance, because few fine mesh nets were hauled there.

*Previous records.* Apart from Hardy and Gunther's records (1935) of *T. mülleri* noted above, the species has not previously been reported from the South Georgia area.

Støp-Bowitz (1949) reported *T. mülleri* from the Antarctic Zone at five stations made by the 'Norwegica', in the summers of 1927–8 and 1928–9 about the Greenwich Meridian. These records are from stations south of 56° 53′ S. and from between 50–19, 100–49, 100–50, 200–98, 400–201 and 400–202 m., of which those hauled above 100 m. are presumably from the Weddell Drift and the others from the Warm Deep Layer. Although small in number these catches provide additional evidence for the suggestion that *T. mülleri* invades the Antarctic Surface Water south of the northern limit of Weddell Drift only.

Monro (1930) reported *T. mülleri* from St. SS 53 but no other references in literature from the South Sandwich area have been noted.

Other records of *T. mülleri* from the Antarctic Zone have been reported by Augener (1929) from the Weddell Sea (0° 23′ S., 200–0 m., and 72° 20′ S., 600–0 m.). From the 'Meteor' expedition Friedrich (1950*c*) reported *Typhloscolex* (probably including *mülleri*) in the Sub-Antarctic and Antarctic Zones as far south as latitude 65° S.

*T. mülleri* has been frequently reported from the Sub-Tropical and Tropical Zones. Reibisch (1895) recorded it in large numbers from 200 m. to the surface, north of 10° S. between Ascension Island and the mouth of the Amazon, and to the Cape Verde Islands. Ehlers (1913) reported it from 12° 11′ S., 6° 16′ W., 2000 m., 10° 45′ S., 6° 32′ W., 400 m., 8° 43′ S., 11° 55′ W., 3000 m. and 0° 52′ S., 16° W., 400 m. Friedrich (1950*c*, fig. 4) may have referred to it in the many *Typhloscolex* records he noted between 40° S. and the Equator. Støp-Bowitz (1951) reported it from Tropical Surface Water.

### *Travisiopsis levinseni*

(Text-fig. 36, Appendices I and II)

*T. levinseni* is a cosmopolitan species normally measuring between 13 and 18 mm. in length; it was caught by all nets used by the Discovery Investigations except the N 50. Although widely distributed in all explored water masses of the South Atlantic, *T. levinseni* was never caught in abundance. In the majority of cases, only a single specimen was taken (the largest catch consisting of three specimens), but there is a possibility that it was accidentally missed by the nets. *T. levinseni* was collected around South Georgia in the Warm Deep Water only; in the South Sandwich Survey, where the majority of nets fished in the Antarctic Surface Water, it was never collected; along the 0° Line it was caught by nineteen nets hauled in the Warm Deep Water and by only three nets in the surface water; elsewhere in the Antarctic Zone it was collected six times in the Warm Deep Water and twice by nets which may have traversed this layer into Antarctic Surface Water. These results suggest that in the Antarctic Zone, *T. levinseni* is probably a Warm Deep Water species.

*Previous records.* *T. levinseni* was collected by 'Discovery' Investigations in the Antarctic and Sub-Tropical Zones (Monro, 1930, as *Sagitella kowalewskii* and *Travisiopsis* sp., and Monro, 1936 as *T. benhami*), and Støp-Bowitz (1949, 1951) reported it from six localities in the Antarctic Zone. The 'Meteor' Expedition collected it in the South Atlantic but no details are available (Friedrich, 1950*c*).

### *Pelagobia longicirrata*

(Text-figs. 37–44, Tables 18 and 19, Appendices I and II)

The cosmopolitan *P. longicirrata* was collected in all explored water masses of the South Atlantic except in the top 100 m. of Sub-Antarctic Surface Water between 45° S. and the Sub-Tropical Convergence in the region of the Greenwich Meridian. This species rarely measures more than 12 mm. in length and was collected mainly by the N 50 and N 70 nets.

In the surveys made about the Greenwich Meridian, *P. longicirrata* was found at all the stations except two, Sts. 1774 and 1777 (Text-figs. 4*a* and *b*); its distribution is shown in Tables 18 and 19, and shows a concentration in the surface layers in summer and migration to depth in winter. It was absent during July and August 1938 from hauls between 100 m. and the surface, and specimens were only collected in this layer in June 1936 at St. 1782. From November to April, however, large numbers of *P. longicirrata* occurred at almost every station between 100 m. and the surface. Below 100 m. the species was present at all depths throughout the year. This seasonal migration to depth is similar to that which Mackintosh (1937) found in 80° W. for the copepods *Rhincalanus gigas* and *Calanus acutus* and the chaetognath *Eukrohnia hamata*.

In the Sub-Antarctic Zone between the Antarctic Convergence and 45° S., *P. longicirrata* appeared abundantly during the summer in the 100–0 m. nets, but north of 45° S. it was absent. Between 45° S. and the Sub-Tropical Convergence, ten nets were hauled in the November–April surveys through 100–50 and 50–0 m. (two each at Sts. 2494, 2592, 2531, 2025 and 2026) and no specimens were taken. Immediately south of Sts. 2494, 2531 and 2025, however, large numbers were collected (forty at Sts. 2495, 470 at St. 2532 and fifteen at St. 2024). The salinity records at these stations show that there is a difference of 0·52 ‰ in the mean salinity of the top 100 m. of water between Sts. 2495 and 2494; that between Sts. 2531 and 2532 a difference of 0·42 ‰ exists and between Sts. 2025 and 2024, 0·39 ‰. Each of these differences represents a greater change in salinity than that found in crossing the Antarctic Convergence on the respective lines, the differences between Sts. 2496–2495 and 2535–2533 being 0·02 ‰ and between Sts. 2022–2023, 0·04 ‰. Two of these changes in salinity are indicated in Text-figs. 18 and 19 (pp. 211, 214) in which the isohalines in the region of the Antarctic Convergence are almost horizontal, whereas at about 45° S. they rise almost vertically to the surface. It is possible therefore, that, although the Antarctic Convergence does not restrict the surface distribution of *P. longicirrata*, a minor convergence may affect it in the Sub-Antarctic Zone, in latitude 45° S., and although cosmopolitan it may have a partially segregated summer population gathering in the surface waters south of 45° S. for feeding and breeding purposes.

The few records of *P. longicirrata* from the surface 50 m. of water around South Georgia (Text-fig. 37) is in direct contrast to its abundance in this layer during the summer months on the Greenwich Meridian. The species was not taken by any of the twenty-five nets hauled between 50–0 m. in February–March 1928, and only eleven specimens were caught at three stations (309 (8), 338 (2), and 334 (1)) in January–February 1930, although fifty-seven nets were hauled through the same depth.

Hardy and Gunther (1935, p. 116) tabulated 459 specimens of *P. longicirrata* as being taken in eighty nets from 50–0 m. At first sight this appears to indicate a widespread distribution of the species in the surface layer; but reference to the basic data, given in Appendix II of their report,

Table 18. Pelagobia longicirrata. *Distribution in the region of the Greenwich Meridian, between 64° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*

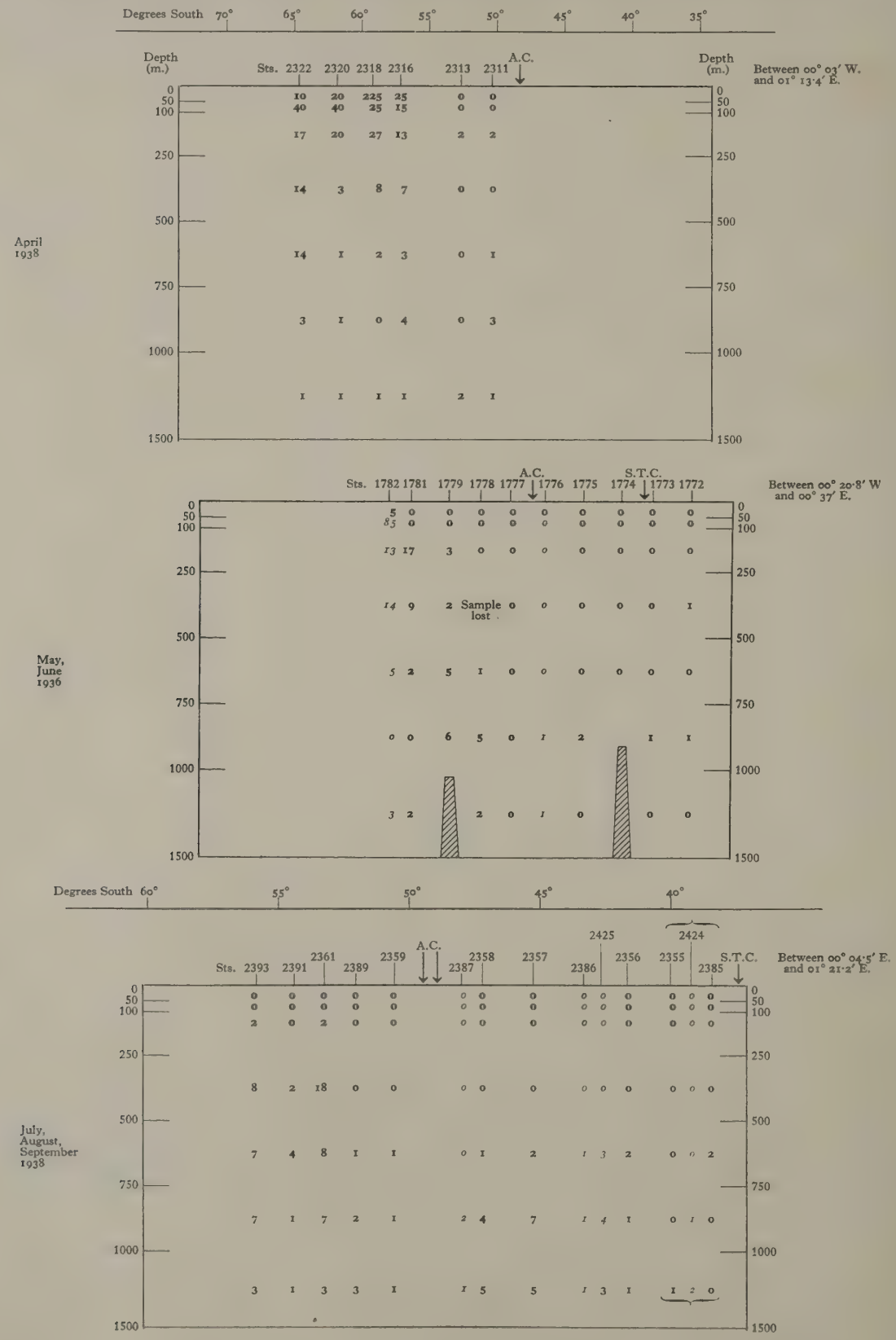
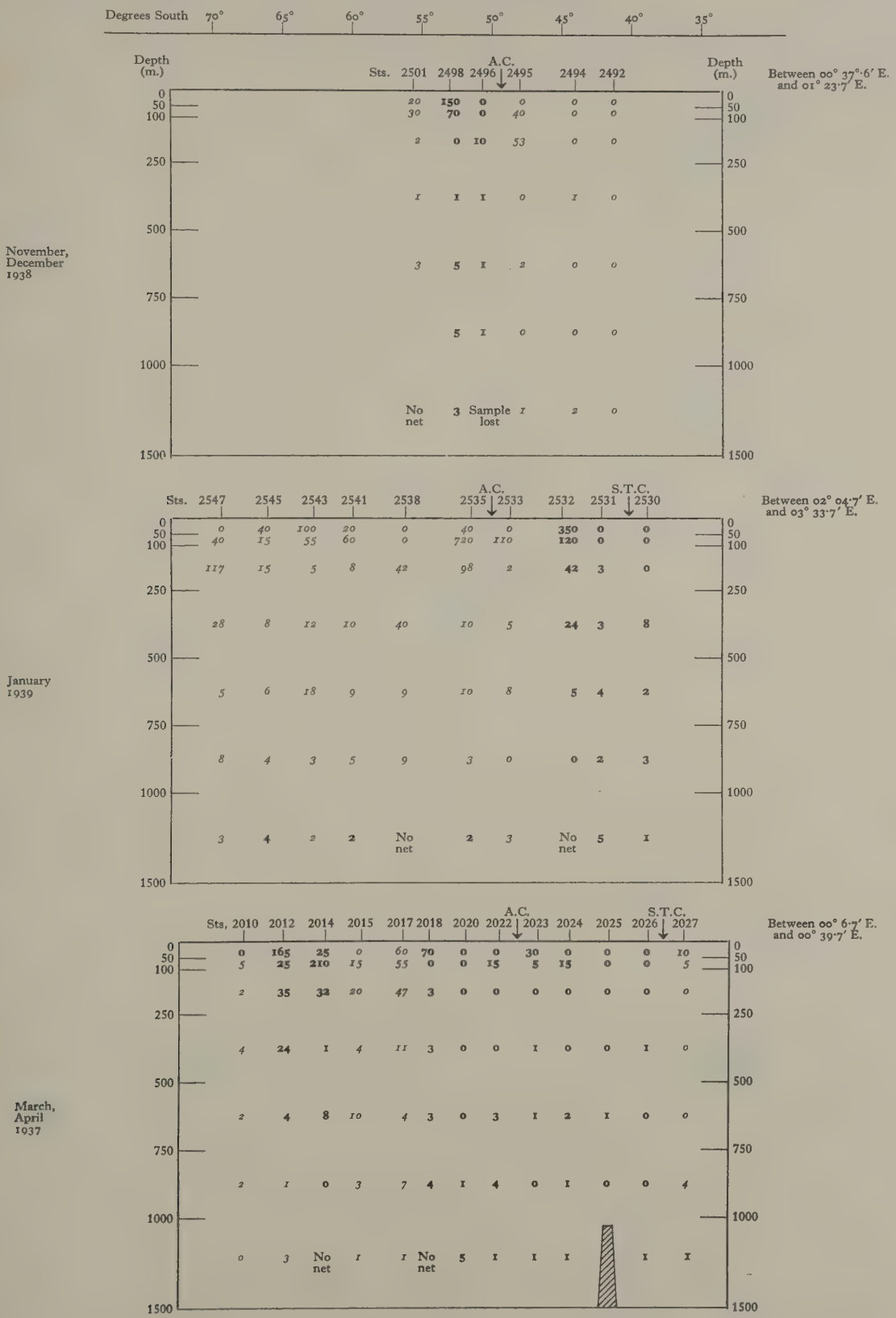


Table 19. Pelagobia longicirrata. *Distribution in the region of the Greenwich Meridian, between 70° S. and 35° S. (N 70 V nets only.) Italic light type indicates hauls made between sunrise and sunset. A.C. = Antarctic Convergence, S.T.C. = Sub-Tropical Convergence.*



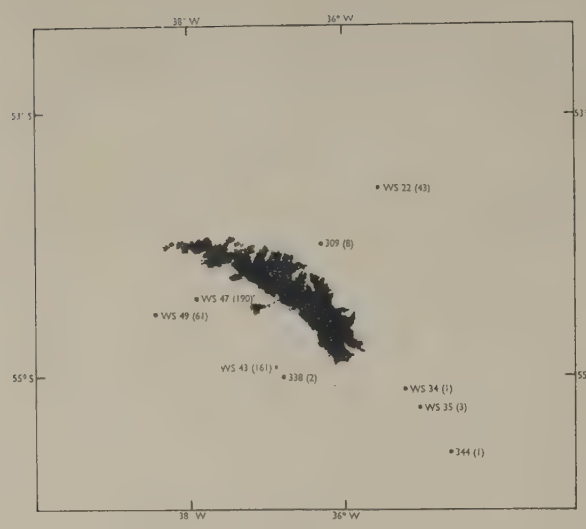



Fig. 37

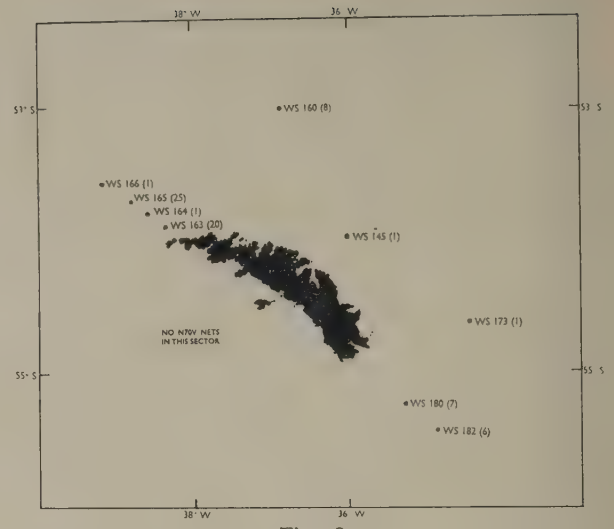



Fig. 38

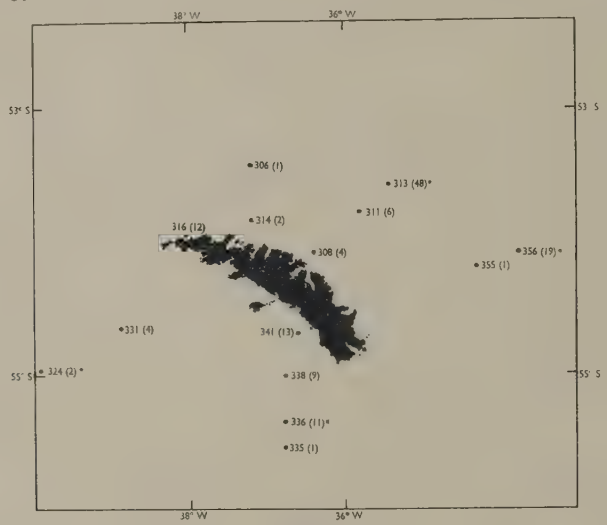



Fig. 39

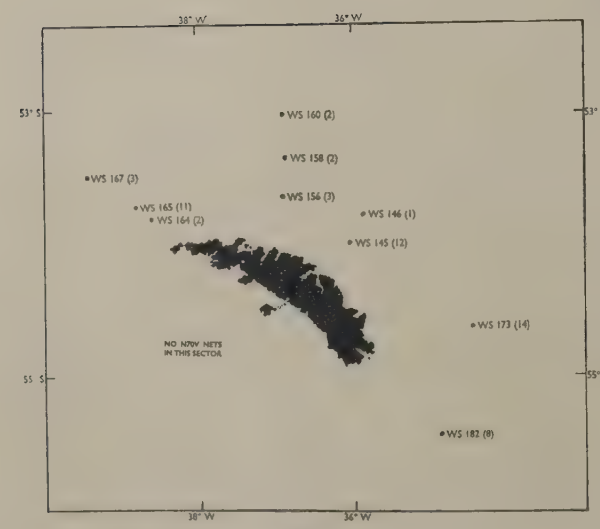



Fig. 40

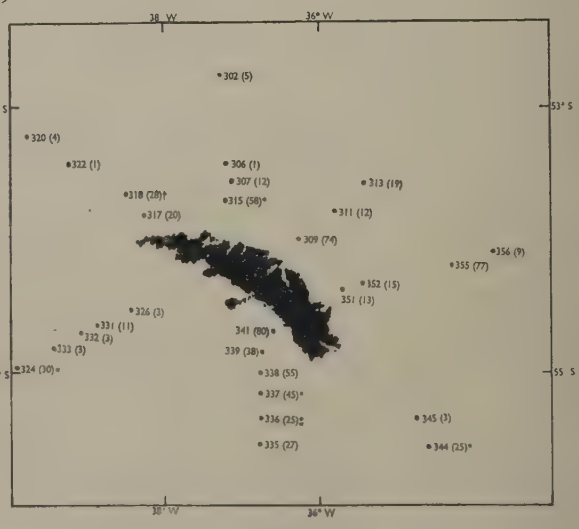



Fig. 41

Text-figs. 37–41. Occurrence of *Pelagobia longicirrata* round South Georgia. N 70 V nets. Number of specimens at each station in brackets. Fig. 37. 50–0 m. Sts. WS 22–49, November–January 1926–7; Sts. 309–44, January–February 1930. Fig. 38. 100–50 m. February–March 1928. Fig. 39. 100–50 m. February–March 1930. Fig. 40. 250–100 m. February–March 1928. Fig. 41. 250–100 m. January–February 1930. * = $\frac{1}{8}$ sample sorted; ** = $\frac{2}{8}$ sample sorted; † = $\frac{3}{10}$ sample sorted.

shows that these 459 specimens occurred at six stations only, two nets containing four specimens and the others 43, 161, 190 and 61 specimens respectively. Of these last, 351 specimens were caught between sunset and sunrise, consequently this sparse, patchy distribution may be due in part to diurnal migration. The positions of these surface stations are also shown in Text-fig. 37.

At depths between 250–50 m., *P. longicirrata* was much more abundant, particularly in the deeper layers of the Antarctic Surface Water (Text-figs. 38–41), and was more generally distributed around the island. Hardy and Gunther recorded a similar picture.

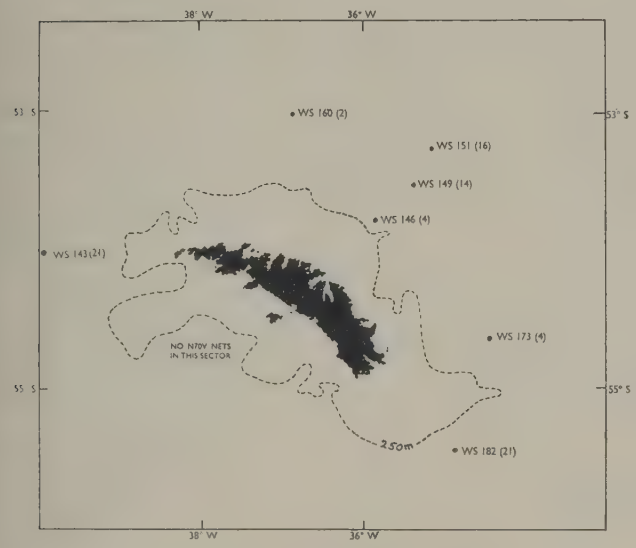



Fig. 42

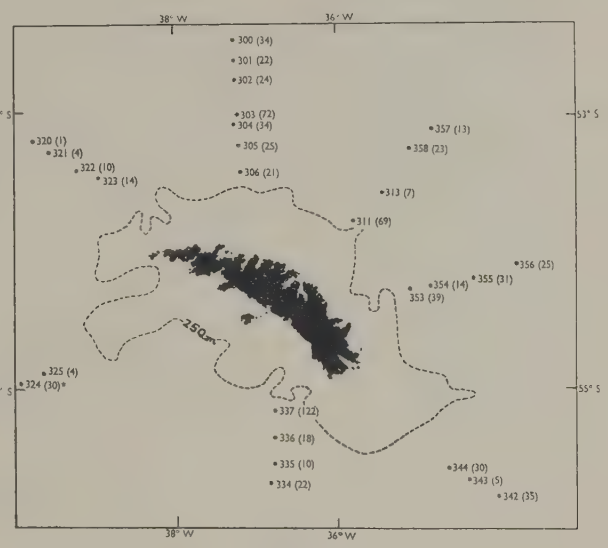



Fig. 43

Text-figs. 42–43. Occurrence of *Pelagobia longicirrata* round South Georgia. N 70 V nets. Number of specimens at each station in brackets. Fig. 42. 1000–250 m. February–March 1928. Fig. 43. 1000–250 m, January–February 1930. * = $\frac{1}{8}$ sample sorted.

*P. longicirrata* was fairly evenly distributed around South Georgia at depths between 250–1000 m., below which nets were not used (Text-figs. 42, 43). In the summer months, its occurrence in the deeper layers gives much the same picture of vertical distribution as that shown for the 0° Line, but I have no evidence of its migration to depth in winter in the South Georgia area.

*P. longicirrata* was also collected around South Georgia at Sts. 17 and 41 (Monro, 1936), and St. 1079; these records have been plotted on Text-fig. 44 and details are listed in Appendix II, Table *j*; they conform to the general pattern already found.

The records of *P. longicirrata* from the South Sandwich Survey are plotted in Text-fig. 44 and listed in Appendix II, Table *b*. It was collected at only sixteen of the fifty-eight stations and never in large numbers, which is surprising because the collections were made during the summer and both N 50 and N 70 nets were used frequently. However, the records are only of restricted value, because nets did not fish below 250 m.

*P. longicirrata* was also collected at numerous miscellaneous stations (Text-fig. 44 and Appendix II) throughout the South Atlantic Ocean.

*Previous records.* Støp-Bowitz (1948) reported *P. longicirrata* from the area about the Greenwich Meridian in twenty-six nets hauled by the 'Norwegica', from depths down to 400 m.; and of these twelve were south of 59° 53′ S. and hauled between 100 m. and the surface.

Apart from the Hardy and Gunther (1935) and Monro (1936) records already noted, only Støp-Bowitz (1949, 1951) has previously reported *P. longicirrata* from South Georgia from collections made by the Norwegian and Swedish Antarctic Expeditions in East Cumberland Bay, from 160 to 72 m. (one specimen) and 150 to 0 m. (one specimen) respectively.

Monro (1936) previously reported *P. longicirrata* from around the South Sandwich Islands, at St. WS 555 and Støp-Bowitz (1949) reported it from two 'Norwegica' Stations at 57° 48′ S., 26° 25′ W., from 400 to 300 m., and 55° 33′ S., 26° 26′ W., from 100 m.

Other records from the Antarctic Zone include Augener (1929) from seventeen stations in the Weddell Sea from 600 m. to the surface. The farthest south of these is in 77° 40′ S. close in to the Filchner shelf ice, the most southerly record for *P. longicirrata* or any adult pelagic polychaete in the Atlantic. The 'Norwegica' (Støp-Bowitz, 1949) collected it at four stations other than those already mentioned, from 59° 53′ S., 8° 40′ W., 400–500 m., 59° 09′ S., 9° 58′ W., 300–100 m., 57° 37′ S., 19° 16′ W., 200–50 m., and 58° 09′ S., 37° 38′ W., 300–200 m., and the Swedish Antarctic Expedition, 1901–3, found it at the following positions, 52° 43′ S., 58° 52′ W., 61° 29′ S., 58° 0′ W. and 63° 33′ S., 44° 26′ W. (Støp-Bowitz, 1951).

North of the Antarctic Convergence Reibisch (1895) reported *P. longicirrata* from Ascension Island north-west to the mouth of the Amazon and north to the Equator, in regular abundance from the surface to 200 m., once at 400 m. and again at 1000 m.; Støp-Bowitz (1951) reported it once off the coast of Brazil at 4° 26′ N., 28° 59′ W., from 750–500 m. Friedrich (1950) noted its abundance throughout the South Atlantic in the 'Meteor' collections but gave no details.

### *Maupasia caeca*

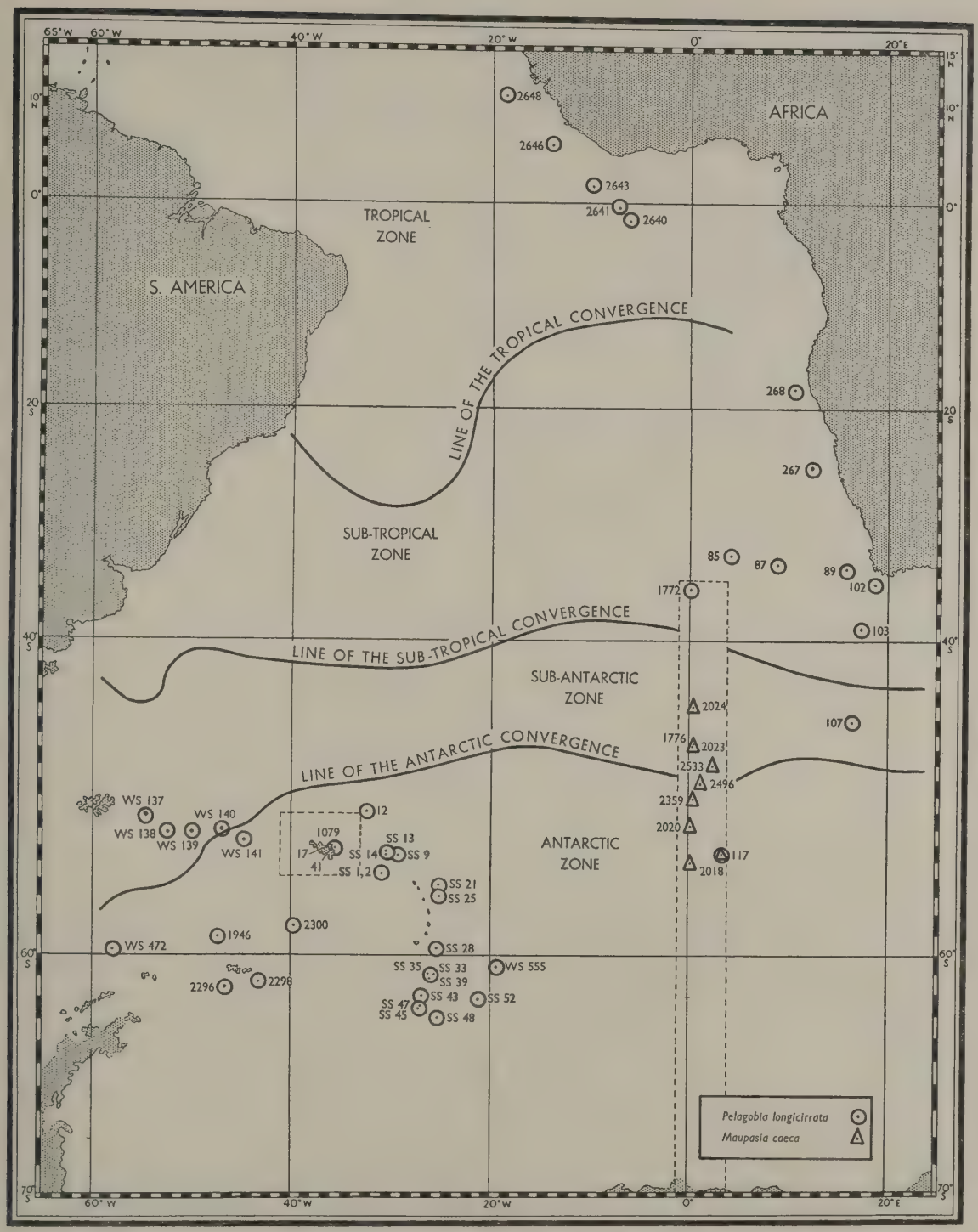
(Text-fig. 44)

*M. caeca* is a widely, though sparsely, distributed species in the South Atlantic Ocean and does not appear to be restricted in its range by surface hydrological boundaries. It rarely measures more than 6 mm. long and was caught only by N 70 nets.

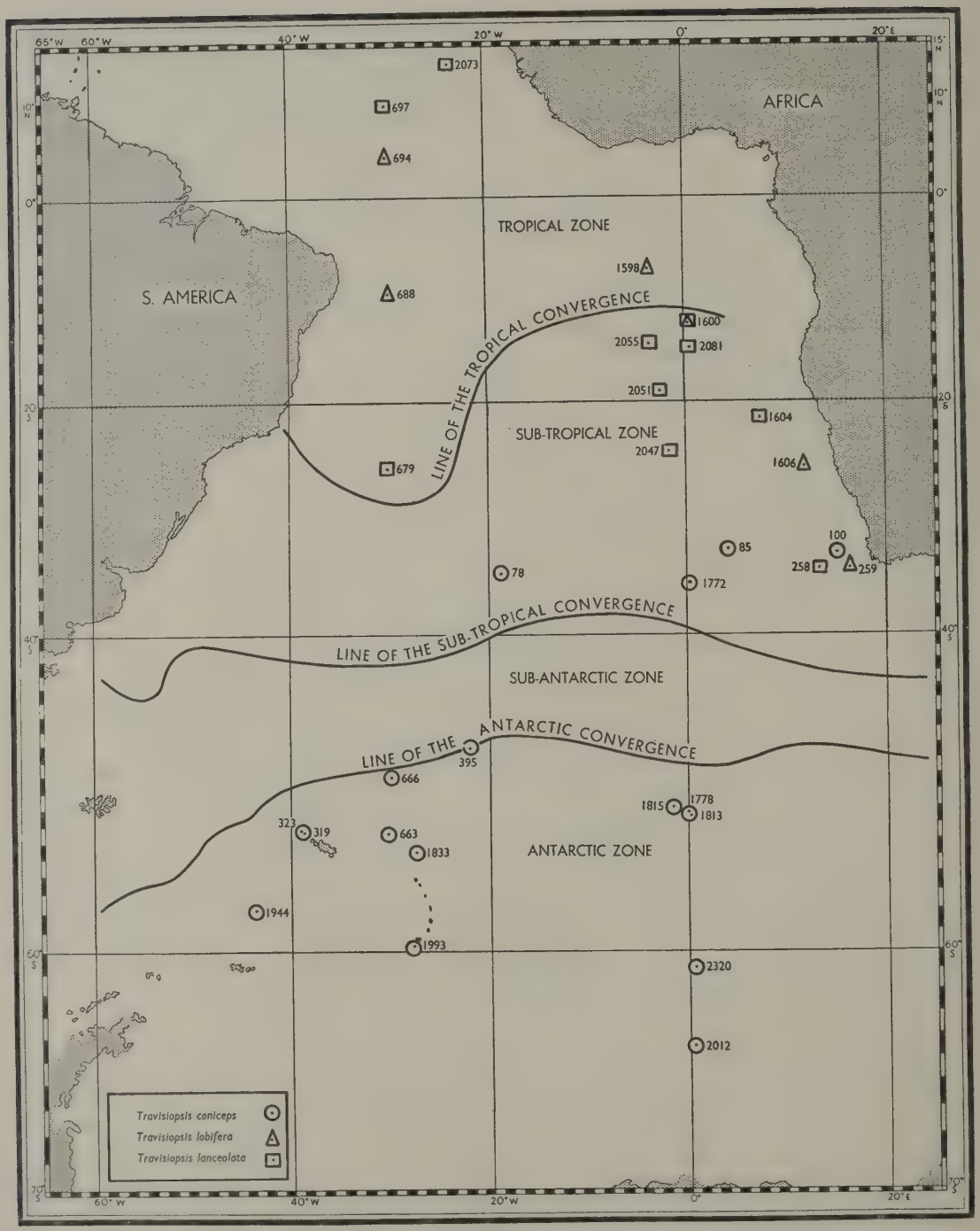
At each of the following stations and depths, one specimen was collected: St. 117, 250–100 and 750–500 m.; St. 1776, 1000–750 m.; St. 2018, 500–250 m.; St. 2020, 1000–750 m.; St. 2023, 750–500 m.; St. 2024, 750–500 m.; St. 2359, 750–500 m.; St. 2496, 500–250 m.; and St. 2533, 1500–1000 m.

These stations include the first records of *M. caeca* in the Antarctic Zone of the South Atlantic Ocean. It was collected in the Warm Deep Water at Sts. 117, 2018, 2020, 2359 and 2496. In the Sub-Antarctic Zone this species occurred in the Antarctic Intermediate Water, at Sts. 1776, 2023 and 2024, and in the Warm Deep Water at St. 2533. There are no records of *M. caeca* in Discovery material from Tropical and Sub-Tropical Zones although it has been reported from there by other workers.

*Previous records.* *M. caeca* was originally described from specimens collected in the Mediterranean (Bay of Algiers) by Viguier (1886); Ehlers (1912) first reported it in the Antarctic Zone from the collections of the National Antarctic Expedition 1901–4 in McMurdo Sound, and from the Deutsche Südpolar-Expedition 1901–3, off Kaiser Wilhelm II Land (Ehlers, 1913). In this latter work, Ehlers also recorded it from 00° 52′ S., 16° 00′ W., in the Tropical Zone of the South Atlantic. Southern (1909) reported this species as *M. caeca* var. *atlantica* from 51° 54′ N., 11° 57′ W.; Fauvel (1916) reported *M. caeca* off Cape Finisterre; Hardy and Gunther (1935) found it at St. WS 70 in the Sub-Antarctic Zone of the South Atlantic, and Wesenburg-Lund (1939) recorded it from the Mediterranean. Friedrich (1950*c*) reported *Maupasia* from the 'Meteor' collections in the Sub-Antarctic Sub-Tropical and Tropical Zones.




Text-fig. 44. Occurrence of *Pelagobia longicirrata* and *Maupasia caeca*. (See also Text-figs. 37–43, and Tables 18, 19).




Text-fig. 45. Occurrence of *Travisiopsis coniceps*, *T. lobifera* and *T. lanceolata*.

### *Travisiopsis coniceps*

(Text-fig. 45, Table 20)

*T. coniceps* is widely distributed throughout the South Atlantic, and, measuring 18–30 mm. in length, could have been collected by all nets used in Discovery Investigations.

In the Antarctic Zone *T. coniceps* was collected in the Warm Deep Water only. In the Sub-Tropical Zone it was caught in South Atlantic Central Water at St. 1772 and at Sts. 78, 85 and 100, where the nets were hauled open to the surface; it may also have been collected in Antarctic Intermediate Water or Warm Deep Water. It is probable that this species normally inhabits the deeper water masses and this may explain the absence of records from the Sub-Antarctic Zone and the Sub-Tropical Zone, north of St. 100, from which regions comparatively few samples have been examined from depth.

Table 20. *Occurrence of* Travisiopsis coniceps

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Antarctic | 319 | **1000–750*** | N 70 V | 2 | Antarctic | 1944 | 1500–1200 | TYFB | 2 |
| | 323 | 750–500 | N 70 V | 1 | | 1993 | 950–650 | TYFB | 2 |
| | 395 | 1600–1500 | N 450 H | 11 | | 2012 | **750–500** | N 70 V | 1 |
| | 663 | 1500–1000 | TYFV | 1 | | 2320 | **1000–750** | N 70 V | 1 |
| | 666 | 3000–2000 | TYFV | 1 | Sub-Tropical | 78 | 1000(–0)† | TYF | 2 |
| | 1778 | **1500–1000** | N 70 V | 1 | | 85 | **2000(–0)** | N 450 | 1 |
| | 1813 | 1500–1000 | N 70 V | 1 | | 100 | 2000(–0) | TYF | 1 |
| | 1815 | 1000–750 | N 70 V | 1 | | 1772 | 440–150 | N 70 B | 1 |
| | 1833 | 1000–750 | N 70 V | 1 | | | | | |

* Heavy type indicates a night haul. † (–0) indicates that the net failed to close and fished open to the surface.

*Previous records.* Monro (1930, 1936) reported *T. coniceps* as *Sagitella lobifera* from the Antarctic Zone at St. 395, and in the Sub-Tropical Zone from Sts. 78, 85 and 100; these records are listed above. Støp-Bowitz (1951) reported it from 49° 56′ S., 49° 56′ W.

### *Travisiopsis lobifera*

(Text-fig. 45, Table 21)

*T. lobifera* was collected only in the Sub-Tropical and Tropical Zones, and, although the records for it are few, its absence from all stations south of the Sub-Tropical Convergence provides some evidence that it is restricted in its southerly distribution at this boundary. This species measures up to 25 mm. in length and could have been caught by most of the nets used in Discovery Investigations.

In the Sub-Tropical Zone, *T. lobifera* was caught in South Atlantic Central Water at Sts. 259 and 1600 and in Antarctic Intermediate Water at St. 1606. In the Tropical Zone it was collected in Tropical Surface Water or South Atlantic Central Water.

Table 21. *Occurrence of* Travisiopsis lobifera

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 259 | **450–370** | TYF | 1 | Tropical | 688 | **450–0** | TYFB | 1 |
| | 1600 | **151–0** | TYFB | 5 | | 694 | **210–0** | TYFB | 1 |
| | | **400–330** | TYFB | 1 | | 1598 | **180–0** | TYFB | 4 |
| | 1606 | **600–500** | TYFB | 1 | | | | | |

*Previous records.* Levinsen (1885) reported *T. lobifera* from the Tropical Zone in 11° 50′ S., 8° 10′ W., and 15° 6′ S., 6° W.

### *Travisiopsis lanceolata*

(Text-fig. 45, Table 22)

The records for *T. lanceolata* are not numerous but they indicate that it has its southern limit of distribution at the Sub-Tropical Convergence. Measuring up to 31 mm. in length *T. lanceolata* could have been caught by all the nets used by Discovery Investigations, in all hydrological zones.

In the Sub-Tropical Zone *T. lanceolata* was taken in the Antarctic Intermediate Water (Sts. 2051, 2047, 2081, 1604) and possibly in the South Atlantic Central Water (Sts. 1600 and 258) also. At St. 2055 it may have penetrated into the Warm Deep Water as well. In the Tropical Zone (Sts. 697 and 2073) *T. lanceolata* was caught in either Tropical Surface Water or South Atlantic Central Water and at St. 679 it occurred either in the Warm Deep Water or the Antarctic Intermediate Water.

Table 22. *Occurrence of* Travisiopsis lanceolata

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 258 | **450–320** | TYF | 1 | Sub-Tropical | 2055 | 1400–2000 | TYFB | 1 |
| | 1600 | **400–330** | TYFB | 2 | | 2081 | 950–500 | TYFB | 2 |
| | 1604 | **620–500** | TYFB | 1 | Tropical | 679 | **1500–1000** | TYFV | 1 |
| | 2047 | 1300–900 | TYFB | 3 | | 697 | **460–0** | TYFB | 1 |
| | 2051 | 990–600 | TYFB | 1 | | 2073 | **375–0** | TYFB | 1 |

*Previous records.* *T. lanceolata* was collected by the Deutsche Südpolar-Expedition in the Tropical and Sub-Tropical Zones of the South Atlantic (Ehlers, 1913, as *Sagittella cornuta* (*sic*)), but in the Indian and Pacific Ocean sectors of the Antarctic this expedition collected it south of the Sub-Tropical Convergence. These anomalous records may be the result of confusion with *T. levinseni*. Monro (1930) reported *T. lanceolata* from the Sub-Tropical Zone as *Sagitella cornuta* and from the Tropical Zone (1939*a* as *T. lanceolata*); Friedrich (1950*c*) reported it from the 'Meteor', collections but gave no details.

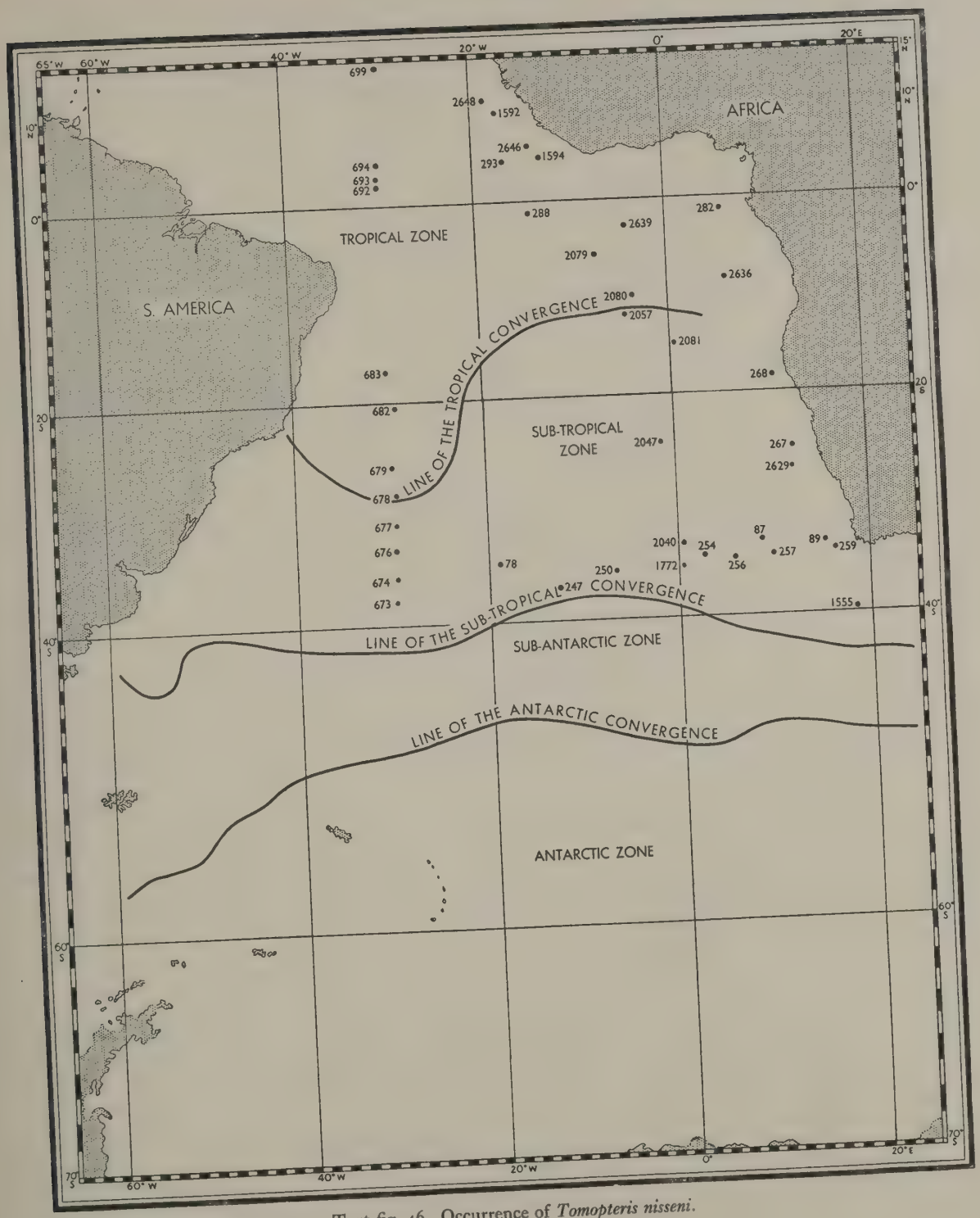
### *Tomopteris nisseni*

(Text-fig. 46, Table 23)

*T. nisseni* was collected in the Sub-Tropical and Tropical Zones only, and its absence from all nets in the Antarctic and Sub-Antarctic Zones indicates that it has its southern limit of distribution at the Sub-Tropical Convergence. The species measures between 8 and 60 mm. long and could have been caught by all nets used in Discovery Expeditions.

In the Sub-Tropical Zone *T. nisseni* was caught in South Atlantic Central Water at Sts. 674, 676, 247, 2040, 254, and in Antarctic Intermediate Water at Sts. 673, 677, 2057, 2047, 2081 and 2629. At the other Stations in this zone the nets crossed the boundaries between these two waters and *T. nisseni* could have been caught in either. In the Tropical Zone it was taken in Antarctic Intermediate water at Sts. 693, 699, 1592, 1594 (1750–950 m.), 2648 (1450–950 m.) 2646 (1500–800 m.) 2639, 2636 and in South Atlantic Central Water at St. 1594 (430–300 m.). At Sts. 678, 679, 682, 683, 692, 2648, 288, 2079, 2080 (400–0 m.), 2646 (250–0 m.), 1594 (144–0 m.) and 282, *T. nisseni* was collected by nets towed in both Tropical Surface and South Atlantic Central Water.

*Previous records.* *T. nisseni* has been reported from the South Atlantic by Rosa (1908*b*) from 20° S., 27° W. and McIntosh (1925) in recording *T. carpenteri* from off South Africa probably also referred to this species. Monro (1930) recorded it from Discovery collections in the Tropical and Sub-Tropical Zones.




Text-fig. 46. Occurrence of *Tomopteris nisseni*.

Table 23. *Occurrence of* Tomopteris nisseni

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 78 | 1000–0 | TYF | 1 | Tropical | 282 | **300(–0)** | TYF | 1 |
| | 87 | 1000–0 | TYF | 4 | | 288 | **250(–0)** | TYF | 1 |
| | 89 | 1000–0 | TYF | 3 | | 293 | **120–100(–0)** | TYF | 1 |
| | 247 | **115–100(–0)** | TYF | 1 | | 678 | **360–0** | TYFB | 1 |
| | 250 | **300(–0)** | TYF | 3 | | 679 | **300–0** | TYFB | 3 |
| | 254 | 200–0 | TYF | 5 | | 682 | **375–0** | TYFB | 1 |
| | 256 | 1100–850(–0) | TYF | 1 | | 683 | **290–0** | TYFB | 3 |
| | 257 | 250–0 | TYF | 3 | | 692 | **350–0** | TYFB | 1 |
| | 259 | **450–370** | TYF | 3 | | 693 | 500–250 | TYFV | 1 |
| | 267 | **550–450(–0)** | TYF | 1 | | 694 | 210–0 | TYFB | 2 |
| | 268 | **150–100(–0)** | TYF | 1 | | 699 | 750–500 | TYFV | 1 |
| | 673 | **2000–1500** | TYFV | 1 | | 1592 | **700–450** | TYFB | 1 |
| | 674 | **280–0** | TYFB | 2 | | 1594 | **144–0** | TYFB | 1 |
| | 676 | **290–0** | TYFB | 2 | | | **430–300** | TYFB | 1 |
| | 677 | 750–500 | TYFV | 1 | | 2079 | **250–0** | TYFB | 2 |
| | 1555 | **1000–0** | TYFB | 1 | | 2080 | 400–0 | TYFB | 1 |
| | 1772 | 750–450 | N 70 B | 1 | | | 1750–950 | TYFB | 1 |
| | 2040 | 600–0 | TYFB | 1 | | 2636 | **950–550** | TYFB | 1 |
| | 2047 | 1300–900 | TYFB | 1 | | 2639 | **1200–600** | TYFB | 1 |
| | 2057 | 1450–700 | N 450 H | 1 | | 2646 | **250–0** | TYFB | 3 |
| | 2081 | 950–500 | TYFB | 1 | | | **1500–800** | TYFB | 1 |
| | 2629 | **1800–1300** | TYFB | 1 | | 2648 | **500–0** | TYFB | 1 |
| | | | | | | | **1450–950** | TYFB | 1 |

## *Tomopteris ligulata*

(Text-fig. 47, Table 24)

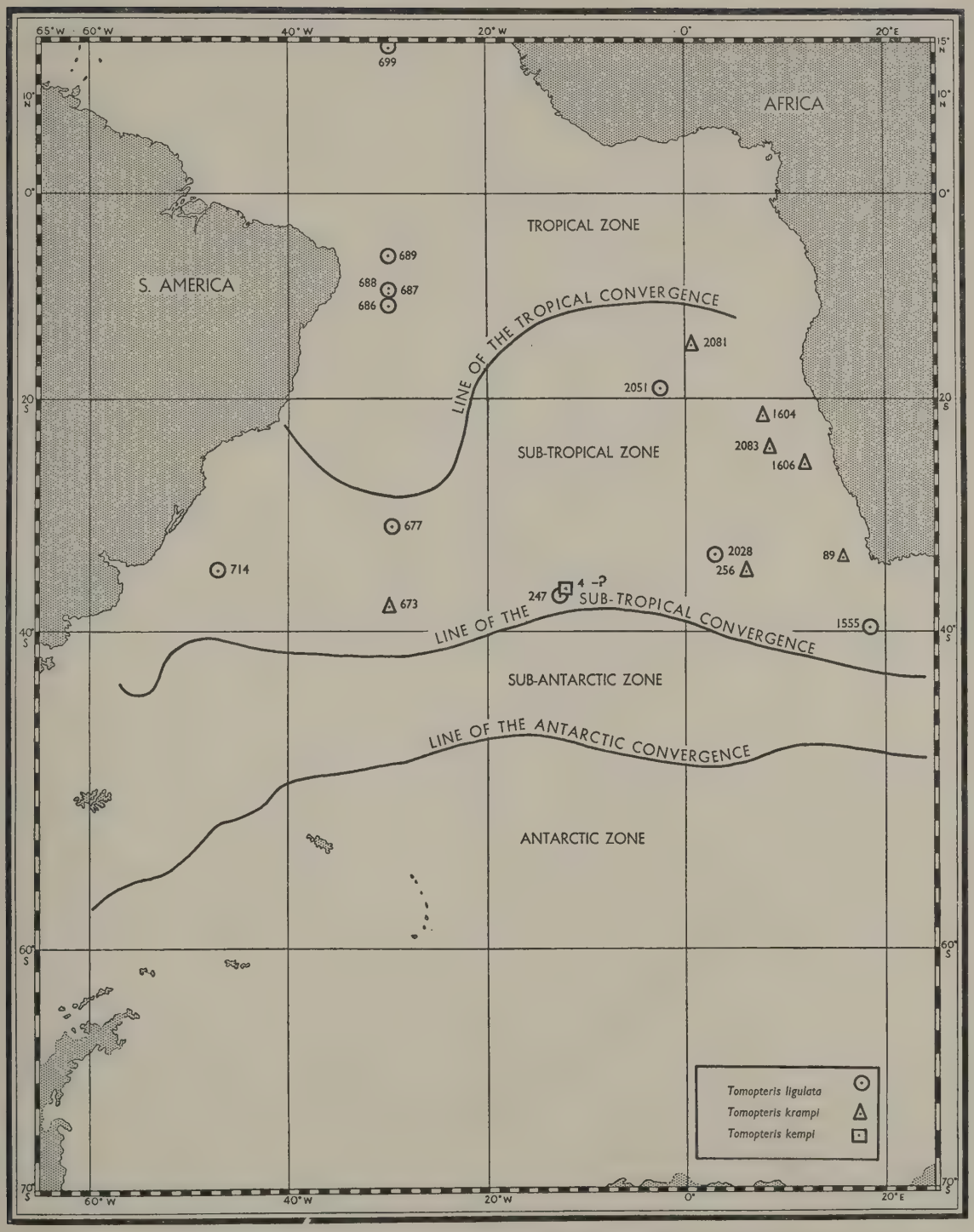
*T. ligulata* was collected only to the north of the Sub-Tropical Convergence and the records obtained indicate that it is restricted in the South Atlantic to the Sub-Tropical and Tropical Zones. *T. ligulata* rarely measures more than 11 mm. in length but it appears to have been missed by the N 50 and N 70 nets and was caught only by the larger N 100 and TYF and it is possible that it is more abundantly distributed than the records suggest.

In the Sub-Tropical Zone *T. ligulata* was collected in South Atlantic Central Water at Sts. 714, 677, 247 and 2028, in Antarctic Intermediate Water at St. 2051, and one or other of these water masses at St. 1555. In the Tropical Zone this species was taken in Tropical Surface Water or South Atlantic Central Water at Sts. 686, 688 and 689, and in Antarctic Intermediate Water at St. 687; at St 699 it was collected in either South Atlantic Central or Antarctic Intermediate Water.

Table 24. *Occurrence of* Tomopteris ligulata

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 247 | **115–100(–0)** | TYF | 1 | Tropical | 686 | **400–0** | TYFB | 1 |
| | 677 | **420–0** | TYFB | 1 | | 687 | 750–500 | TYFV | 1 |
| | 714 | **246–0** | TYFB | 3 | | 688 | **450–0** | TYFB | 2 |
| | 1555 | **1000–0** | TYFB | 1 | | 689 | **410–0** | TYFB | 1 |
| | 2028 | **5–0** | N 100 H | 2 | | 699 | 500–250 | TYFV | 1 |
| | 2051 | 990–600 | TYFB | 1 | | | | | |

*Previous records.* Rosa's (1908*b*) original records of *T. ligulata* included one from the South Atlantic in 33° S., 30′ W., and Monro (1936) reported it (as *T. planktonis*) from St. 714. I have re-examined the specimens reported by Ehlers (1917) as *T. ligulata* from 62° 42′ S., 82° 0′ E. in the Antarctic Zone, and consider them to be *T. planktonis*. Friedrich (1950*c*) probably included this species in his Tomopteridae, reported from the South Atlantic 'Meteor' collections.




Text-fig. 47. Occurrence of *Tomopteris ligulata*, *T. krampi* and *T. kempi*.

### *Tomopteris krampi*

(Text-fig. 47, Table 25)

*T. krampi* has not previously been reported from the South Atlantic Ocean. It varies in length from 9 to 26 mm. and all nets could normally catch it. The few records may be due to the small number of N 70 nets hauled north of the Sub-Tropical Convergence. The species is evidently restricted in its distribution in the South Atlantic by this boundary; none of numerous nets fished to the south collected it.

In the Sub-Tropical Zone, *T. krampi* was collected in South Atlantic Central Water at St. 2083, in Antarctic Intermediate Water at Sts. 673, 2081 and 1604 and in either of these waters at Sts. 89 and 1606.

Table 25. *Occurrence of* Tomopteris krampi

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|
| Sub-Tropical | 89 | 1000–0 | TYF | 2 |
| | 256 | 1100–800(–0) | TYF | 2 |
| | 673 | **1000–750** | TYFV | 1 |
| | 1604 | **620–500** | TYFB | 1 |
| | 1606 | **600–500** | TYFB | 1 |
| | 2081 | 950–500 | TYFB | 1 |
| | 2083 | **330–0** | TYFB | 1 |

*Previous records.* Wesenberg-Lund (1936) and Støp-Bowitz (1948) reported *T. krampi* from the North Atlantic. Friedrich (1950*c*) reports *T. krampi* from the 'Meteor' Expedition, but gives no details of locality and it may have been collected at stations in the North Atlantic Ocean.

### *Tomopteris kempi*

(Text-fig. 47)

The only locality in the world at which *T. kempi* has been collected is 'Discovery' St. 4, from 10 to 0 m. with an N 100 H net, seven specimens (Monro, 1930). The hydrological position of St. 4 is uncertain because it was made very close to the Sub-Tropical Convergence.

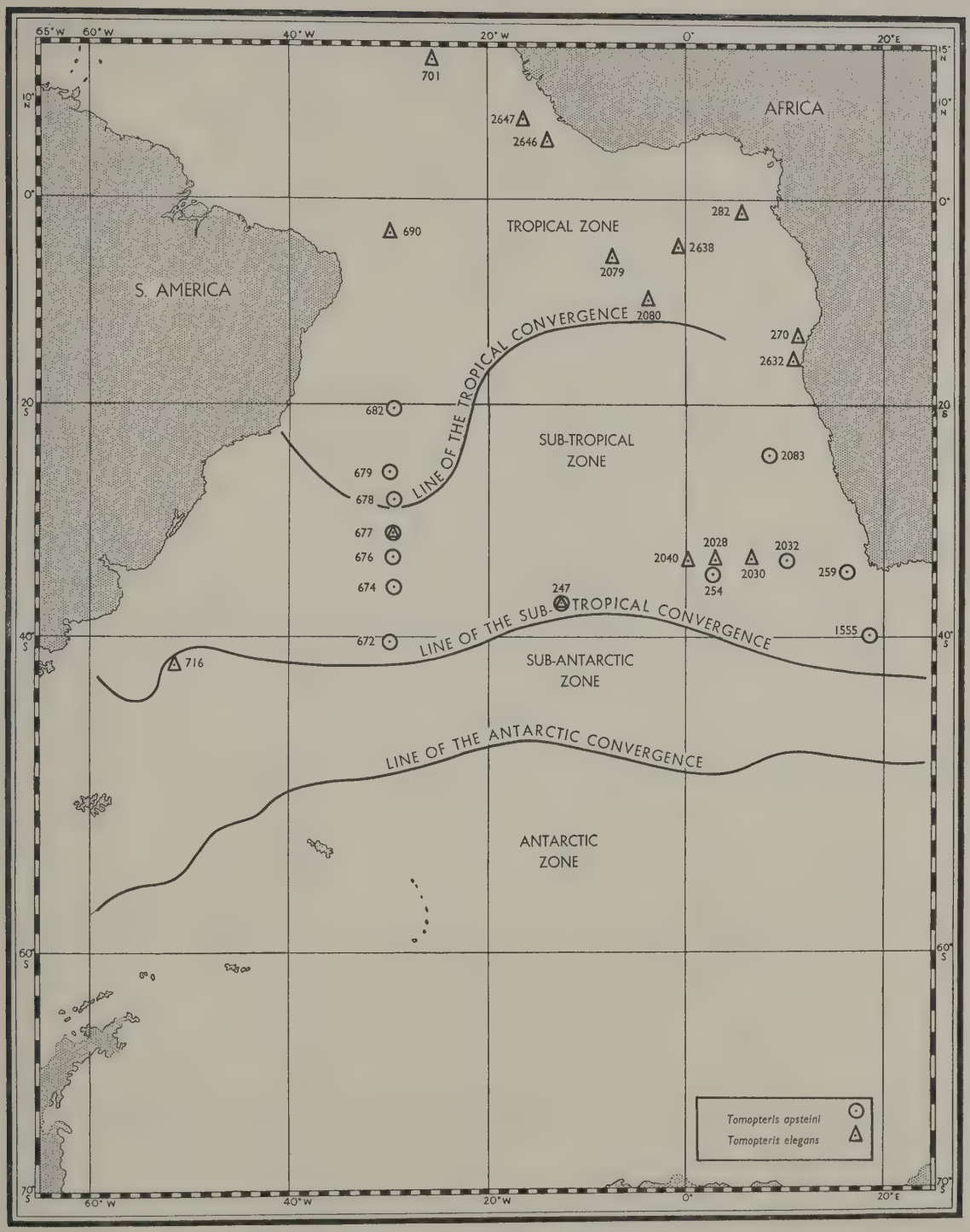
It is remarkable that *T. kempi* has not been found again; it may either have been missed by expeditions and is really widespread in distribution, or is an isolated species.

### *Tomopteris elegans*

(Text-fig. 48, Table 26)

*T. elegans* was collected at sixteen stations north of the Sub-Tropical Convergence and is evidently restricted in its southerly distribution at this boundary. Although this species rarely measures more than 7 mm. long it was collected only twice by an N 70 net whereas the larger TYF caught it fourteen times. It is possible, therefore, that although often missed by the smaller nets, it occurs in sufficient abundance for the larger nets to collect it and the records obtained may not reflect the real intensity of its distribution. The specimen from St. 716 is the only one collected south of this boundary and because no others were caught there I presume this to be an anomaly.

In the Sub-Tropical Zone *T. elegans* was caught in South Atlantic Central Water at Sts. 247, 270, 2028 and 2030, and in either South Atlantic Central Water or Antarctic Intermediate Water at St. 2040. At Sts. 677 and 2632 the nets were hauled from considerable depths and the water masses in which the specimens were collected are uncertain.




Text-fig. 48. Occurrence of *Tomopteris apsteini* and *T. elegans*.

In the Tropical Zone this species was caught in either Tropical Surface Water or South Atlantic Central Water at all stations except 690, in which the net may have also collected it in Antarctic Intermediate Water.

Table 26. *Occurrence of* Tomopteris elegans

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Antarctic | 716 | 212–0 | TYFB | 1 | Tropical | 282 | 300(–0) | TYF | 1 |
| Sub-Tropical | 247 | 115–100(–0) | TYF | 1 | | 690 | 1500–0 | TYFV | 2 |
| | 270 | 200–0 | TYF | 1 | | 701 | 242–0 | TYFB | 1 |
| | 677 | 2000–0 | TYFV | 1 | | 2079 | 250–0 | TYFB | 3 |
| | 2028 | 118–0 | N 70 B | 6 | | 2080 | 400–0 | TYFB | 1 |
| | 2030 | 168–0 | N 70 B | 1 | | 2638 | 150–0 | TYFB | 2 |
| | 2040 | 600–0 | TYFB | 3 | | 2646 | 250–0 | TYFB | 2 |
| | 2632 | 1800–? | TYFB | 1 | | 2647 | 310–0 | TYFB | 1 |

*Previous records.* Ehlers (1917) recorded *T. elegans* from several localities in the Tropical and Sub-Tropical Zones of the South Atlantic all from nets fished through the surface waters. Friedrich (1950*c*) may have included this species in the Tomopteridae of the 'Meteor' collections which he reported from the South Atlantic.

### *Tomopteris apsteini*

(Text-fig. 48, Table 27)

*T. apsteini* was collected only in the Sub-Tropical and Tropical Zones and it is evident that it is restricted in its southerly distribution by the Sub-Tropical Convergence. This species measures from 8 to 47 mm. in length and could have been caught by all the nets used in Discovery Investigations.

In the Sub-Tropical Zone *T. apsteini* was collected in South Atlantic Central Water at Sts. 247, 254, 259, 672, 674, 676, 677 (420–0 m.) and 2032. At St. 1555 it may have been caught also in Antarctic Intermediate Water and at St. 677 (2000–0 m.) also in the Warm Deep Water. In the Tropical Zone, where *T. apsteini* was collected only at stations made along the 30° Line, it was caught by nets which fished in both Tropical Surface Water and South Atlantic Central Water.

Table 27. *Occurrence of* Tomopteris apsteini

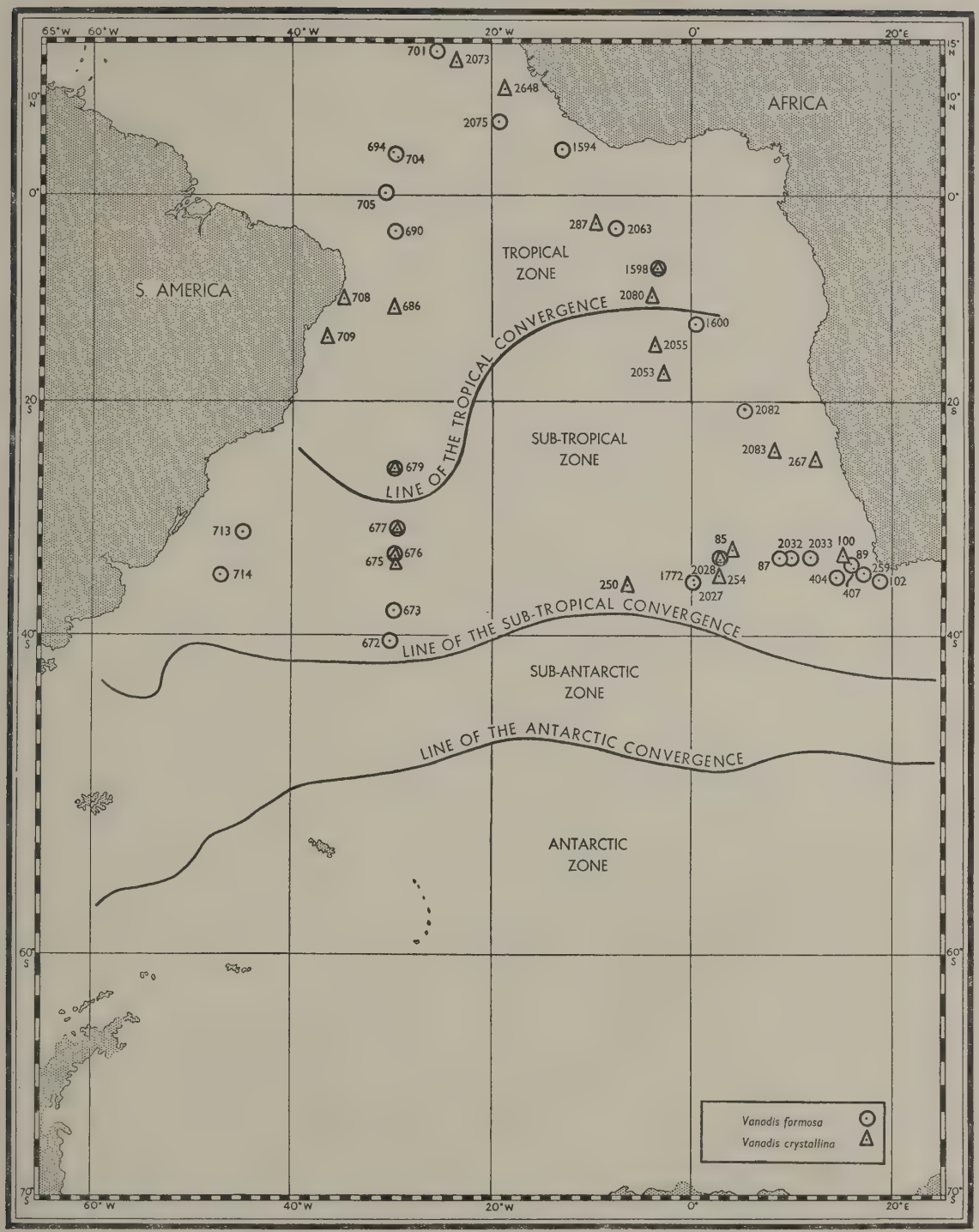
| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 247 | 115–100(–0) | TYF | 2 | Sub-Tropical | 1555 | 1000–0 | TYFB | 2 |
| | 254 | 200–0 | TYF | 1 | | 2032 | 5–0 | N 100 H | 1 |
| | 259 | 450–370 | TYF | 1 | | 2083 | 330–0 | TYFB | 4 |
| | 672 | 200–0 | TYFB | 2 | Tropical | 678 | 360–0 | TYFB | 1 |
| | 674 | 280–0 | TYFB | 2 | | 679 | 250–0 | TYFV | 1 |
| | 676 | 290–0 | TYFB | 2 | | | 300–0 | TYFB | 1 |
| | 677 | 420–0 | TYFB | 1 | | 682 | 375–0 | TYFB | 1 |
| | | 2000–0 | TYFV | 1 | | | | | |

*Previous records.* *T. apsteini* was collected in the South Atlantic by the Deutsche Südpolar-Expedition (Ehlers, 1917, as *T. rosaea*) and possibly also by the 'Meteor' expedition (Friedrich, 1950*c*, as Tomopteridae).

### *Vanadis formosa* and *Vanadis crystallina*

(Text-fig. 49, Tables 28 and 29)

*V. formosa* and *V. crystallina* are closely related and are therefore considered together. Both species inhabit the Sub-Tropical and Tropical Zones and are restricted in their southerly distribution by the Sub-Tropical Convergence. Each is a large species, *V. formosa* measuring up to 300 mm. in length




Text-fig. 49. Occurrence of *Vanadis formosa* and *V. crystallina*.

and *V. crystallina* up to 145 mm., so that they might occur in all samples from the N 100, TYF and N 450 nets.

*V. formosa* was collected in the Sub-Tropical Zone in South Atlantic Central Water at Sts. 102, 259, 404, 407 (220–0 m.) 672, 673, 676, 677, 713, 714, 1600, 1772, 2027, 2032, 2082 and in Antarctic Intermediate Water at Sts. 407 and 2033. At Sts. 87 and 89 in the Sub-Tropical Zone it was caught by nets which fished in both South Atlantic Central and Antarctic Intermediate Water.

Table 28. *Occurrence of* Vanadis formosa

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 87 | 1000–0 | TYF | 1 | Sub-Tropical | 2027 | 310–150 | N 100 B | 1 |
| | 89 | 1000–0 | TYF | 1 | | 2028 | **118–0** | N 70 B | 1 |
| | 102 | 52 | N 100 H | 1 | | 2032 | **111–0** | N 100 B | 3 |
| | 259 | **450–370** | TYF | 2 | | 2033 | 1350–1250 | TYFB | 1 |
| | 404 | 100–0 | N 100 B | 2 | | 2082 | 330–0 | TYFB | 1 |
| | 407 | 220–0 | TYFB | 1 | Tropical | 679 | **300–0** | TYFB | 2 |
| | | 900–800 | N 450 H | 1 | | 690 | **460–0** | TYFB | 3 |
| | 672 | 200–0 | TYFB | 1 | | | **1500–0** | TYFB | 3 |
| | 673 | 340–0 | TYFB | 1 | | 694 | **210–0** | TYFB | 1 |
| | 676 | **290–0** | TYFB | 1 | | 701 | **242–0** | TYFB | 2 |
| | 677 | 250–0 | TYFV | 1 | | 704 | **231–0** | TYFB | 1 |
| | | **420–0** | TYFB | 6 | | 705 | **150–0** | TYFB | 1 |
| | 713 | **200–0** | TYFB | 2 | | 1594 | **144–0** | TYFB | 1 |
| | 714 | **246–0** | TYFB | 3 | | 1598 | **180–0** | TYFB | 2 |
| | 1600 | **151–0** | TYFB | 1 | | 2063 | 1150–600 | TYFB | 1 |
| | 1772 | 113–0 | N 100 B | 1 | | 2075 | **1200–950** | TYFB | 1 |

In the Tropical Zone *V. formosa* was collected in either Tropical Surface or Antarctic Intermediate Water at Sts. 690 (460–0 m.), 694, 701, 705, 704, 1594, 1598 and in Antarctic Intermediate Water at Sts. 2063 and 2075. The net which collected this species at St. 690 (1500-0 m.) fished in Tropical Surface, South Atlantic Central, Antarctic Intermediate or Warm Deep Water.

*V. crystallina* was caught in the Sub-Tropical Zone in South Atlantic Central Water at Sts. 250, 254, 675, 676, 677, 2028 and 2083, in Antarctic Intermediate Water at St. 2053 and in Warm Deep Water at Sts. 100 and 2055. The net which collected this species at St. 85 fished in South Atlantic Central, Antarctic Intermediate and Warm Deep Water.

In the Tropical Zone *V. crystallina* was collected in Tropical Surface or South Atlantic Central Water at Sts. 708, 709, 1598 (180–0 m.), 2073, 2080 and 2648 and in the South Atlantic Central Water or Antarctic Intermediate Water at St. 1598 (460–300 m.).

Table 29. *Occurrence of* Vanadis crystallina

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 85 | **2000(–0)** | N 450 H | 1 | Sub-Tropical | 2055 | 2000–1400 | TYFB | 1 |
| | 100C | 2000–2500 | TYF | 1 | | 2083 | **330–0** | TYFB | 1 |
| | 250 | **300(–0)** | TYF | 4 | Tropical | 679 | **300–0** | TYFB | 2 |
| | 254 | **200–0** | TYF | 2 | | 686 | **400–0** | TYFB | 1 |
| | 267 | **550–450(–0)** | TYF | 1 | | 708 | **208–0** | TYFB | 2 |
| | 287 | **1000–800(–0)** | TYF | 1 | | 709 | **216–0** | TYFB | 1 |
| | 675 | 250–0 | TYFV | 1 | | 1598 | **180–0** | TYFB | 2 |
| | 676 | **290–0** | TYFB | 1 | | | **460–300** | TYFB | 1 |
| | 677 | **420–0** | TYFB | 3 | | 2073 | **375–0** | TYFB | 1 |
| | 2028 | **118–0** | N 70 B | 4 | | 2080 | 400–0 | TYFB | 1 |
| | | **118–0** | N 100 B | 1 | | 2648 | **500–0** | TYFB | 1 |
| | 2053 | 900–500 | TYFB | 1 | | | | | |

*Previous records.* *V. formosa* was reported by Greeff (1885 as *Alciopa longirhyncha*) from off islands in the Gulf of Guinea. Apstein (1900) reported *Vanadis formosa* and *V. crystallina* from numerous localities in the South Atlantic between Ascension Island and the Equator and Ascension Island and the mouth of the Amazon. Monro (1930, 1936) recorded *V. formosa* from several stations made by 'Discovery' Investigations in the Tropical and Sub-Tropical Zones, and he also reported *V. crystallina* in 1936 from the Cape Verde to Falkland Islands line of stations. From the 'Meteor' collections, Friedrich (1950*c*), reported *V. crystallina* but he gave no details.

### *Rhynchonerella angelini*

(Text-fig. 50)

*R. angelini* is known from few records, all from the Sub-Tropical Zone, and it is possible that it is limited in its southerly distribution at the Sub-Tropical Convergence. This species may measure up to 67 mm. in length and would normally only be caught by the larger nets.

The following records of *R. angelini*, except that from St. 74, are taken from Monro's 1930[1] and 1936 Discovery Reports; all these specimens have been re-examined: St. 74, N 70 V, 1000–0 (1); St. 250, TYF, 300–0 (2); St. 257, TYF, 250–0 (1); St. 268, TYF, 150–100–0 (1); St. 405, TYFB, 1200–0 (1). *R. angelini* was caught in South Atlantic Central Water at Sts. 250, 257 and 260; at Sts. 74 and 405 it could have been collected in either South Atlantic Central Water or Antarctic Intermediate Water.

*Previous records.* Records of *R. angelini* from the South Atlantic were made by Greeff (1876, as *Callizona grubei*) and Levinsen (1885, as *Callizona grubei*) all north of the Sub-Tropical Convergence. Friedrich (1950*c*) reported it from the 'Meteor' collections (as *Callizona angelini*) but gave no details.

### *Krohnia lepidota*

(Text-fig. 50, Table 30)

*K. lepidota* is known from few records all north of the Sub-Tropical Convergence and it is possible that this boundary restricts its southerly distribution. Measuring up to 50 mm. long *K. lepidota* was normally only collected by the larger nets but a fragment was caught by the N 50 V at St. 2641.

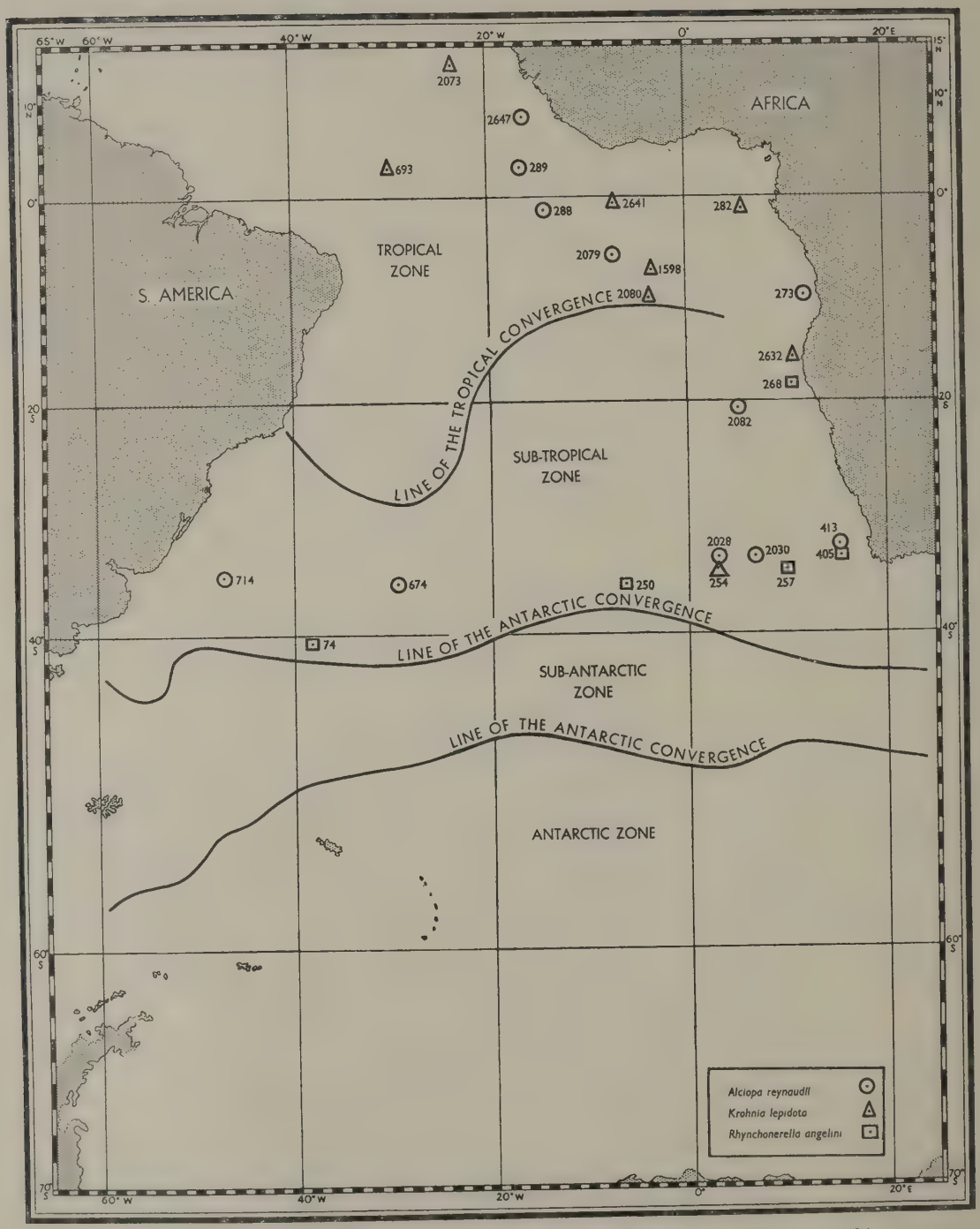
In the Sub-Tropical Zone *K. lepidota* was caught in South Atlantic Central Water at St. 254 and in this water mass, or Antarctic Intermediate or Warm Deep Water at St. 2632. In the Tropical Zone *K. lepidota* was collected at all stations in either Tropical Surface Water or South Atlantic Central Water.

Table 30. *Occurrence of* Krohnia lepidota

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 254 | 200(–0) | TYF | 2 | Tropical | 1598 | **180–0** | TYFB | 1 |
| | 2632 | **1800–0** ? | TYFB | 1 | | 2073 | **375–0** | TYFB | 1 |
| Tropical | 282 | **300(–0)** | TYF | 1 | | 2080 | 400–0 | TYFB | 2 |
| | 693 | 250–0 | TYFV | 2 | | 2641 | **100–0** | N 50 V | 1 |

*Previous records.* *K. lepidota* was reported by Apstein (1900, as *Callizonella lepidota*), from four stations between the Equator and Ascension Island, and at three between Ascension Island and the mouth of the Amazon. Under this name also, Friedrich (1950*c*) reported *K. lepidota* from the 'Meteor' collections in the South Atlantic but he gave no details.

[1] Monro's specimen from 'Discovery', St. 245, was not deposited in the British Museum (N.H.) collections.




Text-fig. 50. Occurrence of *Rhynchonerella angelini, Krohnia lepidota* and *Alciopa reynaudii.*

## *Alciopa reynaudii*

(Text-fig. 50, Table 31)

*A. reynaudii* was collected only to the north of the Sub-Tropical Convergence and is restricted in its distribution in the South Atlantic to the Sub-Tropical and Tropical Zones. Measuring between 30 and 40 mm. in length this species was normally collected only by the larger nets.

In the Sub-Tropical Zone *A. reynaudii* was collected in South Atlantic Central Water and in the Tropical Zone in South Atlantic Central or Tropical Surface Water.

Table 31. *Occurrence of* Alciopa reynaudii

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 413 | 350–0 | TYFB | 1 | Sub-Tropical | 2082 | 330–0 | TYFB | 1 |
| | 674 | **280–0** | TYFB | 1 | Tropical | 273 | **200–230(–0)** | TYF | 1 |
| | 714 | 246–0 | TYFB | 1 | | 288 | **250(–0)** | TYF | 1 |
| | 2028 | **5–0** | N 100 H | 2 | | 289 | **225–125(–0)** | TYF | 1 |
| | | **118–0** | N 70 B | 1 | | 2079 | **250–0** | TYFB | 1 |
| | 2030 | 168–0 | N 100 B | 1 | | 2647 | **310–0** | TYFB | 1 |

*Previous records.* *A. reynaudii* has been reported from the Tropical Zone in the South Atlantic by Greeff (1876, as *Nauphanta celox*) and Wesenberg-Lund (1939, as *Greefia oahuensis*) and from the Tropical and Sub-Tropical Zones by Levinsen (1885, as *Nauphanta celox*) and Monro (1930, 1936, as *Greefia oahuensis*).

## *Naiades cantrainii*

(Text-fig. 51, Table 32)

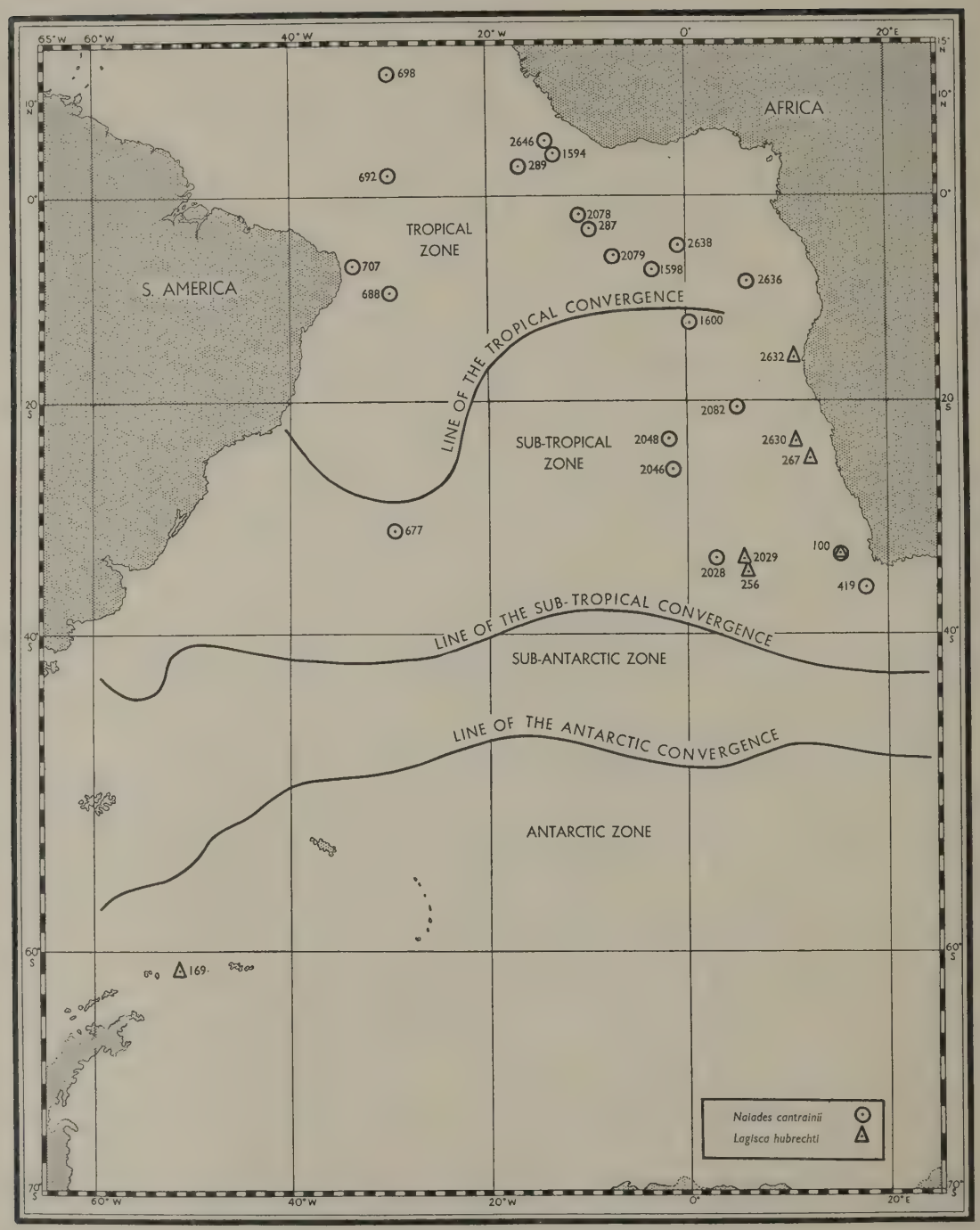
*N. cantrainii* occurs in abundance in the South Atlantic where it is clearly limited in its southerly distribution at the Sub-Tropical Convergence. Measuring up to 110 mm. in length this species was normally collected only by the larger nets.

In the Sub-Tropical Zone *N. cantrainii* was collected in South Atlantic Central Water at Sts. 677, 1600, 2028, 2082, 419 and 100 and in South Atlantic Central Water or Antarctic Intermediate Water at Sts. 2048 and 2046. In the Tropical Zone the collections at Sts. 289 and 2646 were made in South Atlantic Central Water and in this water mass or Tropical Surface Water at Sts. 707, 688, 692, 1594, 2079 (250–0 m.), 1598 and 2638. The specimen collected at St. 2078 was taken from Warm Deep Water and those from Sts. 2079 (555–250 m.) and 2636 from the Antarctic Intermediate layer or South Atlantic Central Water.

Table 32. *Occurrence of* Naiades cantrainii

| Zone | Station no. | Depth (m.) | Net | No. of specimens | Zone | Station no. | Depth (m.) | Net | No. of specimens |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 100 | 475(–0) | TYF | 1 | Tropical | 692 | 350–0 | TYFB | 1 |
| | 419 | 50–0 | N 70 V | 1 | | 698 | 470–0 | TYFB | 1 |
| | 677 | 250–0 | TYFV | 2 | | 707 | **182–0** | TYFB | 1 |
| | 1600 | **151–0** | TYFB | 1 | | 1594 | **144–0** | TYFB | 2 |
| | | **400–330** | TYFB | 1 | | 1598 | **180–0** | TYFB | 6 |
| | 2028 | **118–0** | N 70 B | 1 | | 2078 | 2600–1400 | TYFB | 1 |
| | 2046 | 500–0 | N 450 B | 1 | | 2079 | **250–0** | TYFB | 1 |
| | 2048 | 600–0 | N 450 B | 1 | | | **555–250** | TYFB | 1 |
| | 2082 | 330–0 | TYFB | 2 | | 2636 | **950–550** | TYFB | 1 |
| Tropical | 287 | **1000–800(–0)** | TYF | 2 | | 2638 | **150–0** | TYFB | 2 |
| | 289 | **225–125(–0)** | TYF | 1 | | 2646 | **250–100** | TYFB | 1 |
| | 688 | 450–0 | TYFB | 2 | | | | | |

*Previous records.* *N. cantrainii* was reported from a station on the Equator by Apstein (1900, as *Alciopa cantrainii*) and Monro (1930, 1936) reported it from the Tropical Zone in the South Atlantic.




Text-fig. 51. Occurrence of *Naiades cantrainii* and *Lagisca hubrechti*.

## *Lagisca hubrechti*

(Text-fig. 51, Table 33)

*L. hubrechti* was found in thirteen samples from six stations in the Sub-Tropical Zone and in one sample in the Antarctic Zone. This species varies in length between 5–22 mm. and could have been caught by most nets.

At St. 100, *L. hubrechti* was collected in South Atlantic Central Water, Antarctic Intermediate Water and also in the Warm Deep Layer, and it occurs more frequently in the deeper waters at the other stations made in the Sub-Tropical Zone. The single record of *L. hubrechti* from the Antarctic Zone cannot be considered an anomaly because our knowledge of the pelagic Polynoinae is limited to comparatively few records of several species which may represent pelagic phases of bottom living forms and it is possible that *L. hubrechti* is one of these. More information on the life cycle of this species is necessary before its distribution can be analysed.

Table 33. *Occurrence of* Lagisca hubrechti

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Antarctic | 169 | 1100–1000 | TYF | 1 | Sub-Tropical | 100 | 2500–2000 | TYF | 15 |
| Sub-Tropical | 100 | 225 | TYF | 6 | | | 2500(–0) | TYF | 11 |
| | | 475(–0) | TYF | 3 | | 256 | 1100–850(–0) | TYF | 3 |
| | | 550–450 | TYF | 5 | | 267 | 550–450(–0) | TYF | 1 |
| | | 675–625 | TYF | 6 | | 2029 | 2900–2600 | TYFB | 1 |
| | | 1000–300 | TYF | 1 | | 2630 | 1050–550 | TYFB | 1 |
| | | 1000–900 | TYF | 1 | | 2632 | 1800–0 ? | TYFB | 1 |

*Previous records.* Monro (1930) reported *L. hubrechti* from 'Discovery' collections in the Antarctic Zone (St. 169, as above) and in the Sub-Tropical Zone.

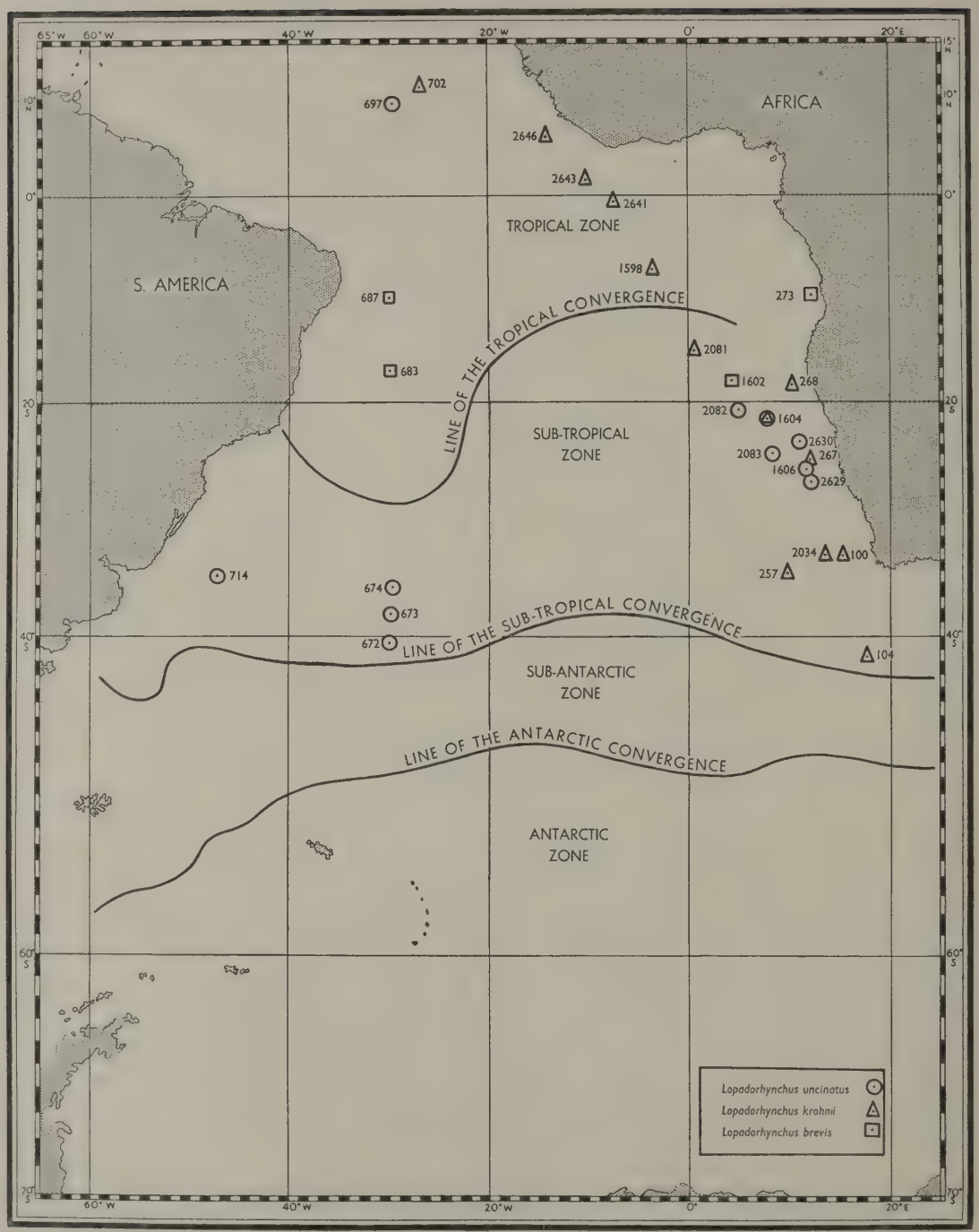
## *Lopadorhynchus uncinatus*, *Lopadorhynchus krohnii* and *Lopadorhynchus brevis*

(Text-fig. 52, Table 34)

*L. uncinatus* and *L. krohnii* were collected at numerous stations north of the Sub-Tropical Convergence and it is evident that they are limited in their southerly distribution by this barrier; *L. brevis* was collected at only four stations, all north of the Sub-Tropical Convergence and it is possible that this species also is limited by this barrier, but the records are too few to warrant drawing firm conclusions about its distribution. *L. uncinatus* measures between 13–24 mm. in length, *L. krohnii* between 5–10·5 mm. and *L. brevis* 7–20 mm.; normally all three could be caught by the N 70 nets and *L. uncinatus* and *L. brevis* could also be collected by the N 100 and TYF.

In the Sub-Tropical Zone *L. uncinatus* was collected in either the South Atlantic Central Water or Antarctic Intermediate Water at Sts. 714, 672, 673, 674, 1604, 2083 and 1606; in Antarctic Intermediate Water at Sts. 2082 and 2630; and in this layer or in the Warm Deep Water at St. 2629. In the Tropical Zone the net which caught it at St. 697, fished in both Tropical Surface Water and South Atlantic Central Water.

*L. krohnii* was collected in the Sub-Tropical Zone in South Atlantic Central Water at Sts. 104, 257, 268, 2034, 1604 and 2081 and in Warm Deep Water at Sts. 100 (2500–2000 m.). At St. 100 (475–0 m.) it was caught in either South Atlantic Central Water or Antarctic Intermediate Water. In the Tropical Zone *L. krohnii* was collected in Tropical Surface Water or South Atlantic Central




Text-fig. 52. Occurrence of *Lopadorhynchus uncinatus*, *L. krohnii* and *L. brevis*.

Water at Sts. 702, 2643 and 2641, in Antarctic Intermediate Water or South Atlantic Central Water at St. 1598, and in Warm Deep Water or Antarctic Intermediate Water at St. 2646.

*L. brevis* was collected in South Atlantic Central Water at St. 1602 in the Sub-Tropical Zone and at Sts. 273 and 687 in the Tropical Zone. At St. 683 it was collected in either Tropical Surface Water or South Atlantic Central Water.

Table 34. *Occurrence of* Lopadorhynchus uncinatus, krohnii *and* brevis

*Occurrence of* Lopadorhynchus uncinatus

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 672 | 200–0 | TYFB | 1 | Sub-Tropical | 2082 | 1100–800 | TYFB | 1 |
| | 673 | 340–0 | TYFB | 1 | | 2083 | **330–0** | TYFB | 7 |
| | 674 | **280–0** | TYFB | 1 | | 2629 | **1800–1300** | TYFB | 1 |
| | 714 | **246–0** | TYFB | 1 | | 2630 | **1050–550** | TYFB | 1 |
| | 1604 | **182–0** | TYFB | 2 | Tropical | 697 | **460–0** | TYFB | 1 |
| | 1606 | **190–0** | TYFB | 3 | | | | | |

*Occurrence of* Lopadorhynchus krohnii

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* | *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|---|---|---|---|---|
| Sub-Tropical | 100 | 475(–0) | TYFB | 1 | Sub-Tropical | 2034 | **5–0** | N 100 H | 1 |
| | | 2500–2000 | TYFB | 1 | | 2081 | 950–500 | TYFB | 1 |
| | 104 | 5–0 | N 100 H | 1 | Tropical | 702 | **236–0** | TYFB | 1 |
| | 257 | **250(–0)** | TYF | 1 | | 1598 | **460–300** | TYFB | 6 |
| | 267 | **550–450(0)** | TYF | 3 | | 2641 | **100–0** | N 50 V | 1 |
| | 268 | **150–100(–0)** | TYF | 2 | | 2643 | **100–0** | N 50 V | 1 |
| | 1604 | **620–500** | TYFB | 1 | | 2646 | **1500–800** | TYFB | 1 |

*Occurrence of* Lopadorhynchus brevis

| *Zone* | *Station no.* | *Depth (m.)* | *Net* | *No. of specimens* |
|---|---|---|---|---|
| Sub-Tropical | 1602 | **175–0** | TYFB | 1 |
| Tropical | 273 | **230–200(–0)** | TYF | 1 |
| | 683 | **290–0** | TYFB | 1 |
| | 687 | 500–250 | TYFV | 1 |

*Previous records.* *L. uncinatus* was reported by Monro (1936) from St. 714 as listed above, and he also records *L. krohnii* in the same paper from St. 702 as *L. krohnii* var. *simplex*. Reibisch (1895) records *L. krohnii* as *L. viguieri* from near the Equator, and Friedrich (1950*c*) notes its presence in the 'Meteor' collections; *L. brevis* was collected by the Deutsche Südpolar Expedition in the Tropical Zone of the South Atlantic (Ehlers, 1913) and Monro (1930) recorded it from St. 273.

## ZOOGEOGRAPHICAL REVIEW

It has long been known that the total plankton production is greater in higher latitudes than in the tropics and successive expeditions have established that this is especially true of the South Atlantic (Friedrich, 1950*b*; Foxton, 1956). Except off the south-west coast of Africa where the effect of the cold Benguela current is dominant, the total number of plankton organisms in the top 50 m. of water is at least ten times greater in the Antarctic Zone than in the Sub-Tropical and Tropical Zones [Hentschel (1933); Sverdrup, Johnson and Fleming (1946)]. The total plankton collected in summer between 1000–0 m. by seven expeditions has been compared by Foxton (1956) who found the ratio of the

amount collected in the higher latitudes to that in the lower to vary between 14:1 (Meteor) to 4·5:1 (Discovery). Only a few species, occurring in large numbers, make up the abundant plankton in the upper 150 m. of water in the Antarctic Zone (Hardy and Gunther, 1935), whereas in the Sub-Tropical and Tropical Zones many species form the small standing crop (Sverdrup, Johnson and Fleming, 1946).

The twenty-nine polychaetes examined in this report conform to this general pattern of plankton distribution. The most abundant is the cosmopolitan *Pelagobia longicirrata* which occurs in large numbers in the Antarctic Zone. This species is particularly abundant along the Greenwich Meridian in the top 100 m. of water and around South Georgia between 250–50 m. The endemic antarctic *Rhynchonerella bongraini* is also abundant but being more restricted in its distribution than *Pelagobia longicirrata* has not been collected so extensively. The nine other species inhabiting the Antarctic Zone do not appear in large numbers; seven of them are cosmopolitan or widely distributed. Sixteen species appear to be limited in their southerly distribution by the Sub-Tropical Convergence but none of them occurs in abundance. Only the cosmopolitan *Tomopteris septentrionalis* and *T. planktonis* have been collected in large numbers in the Sub-Tropical Zone off South Africa in a region where intensive collections were made.

The following points of interest have emerged from the present survey:

1. There are no families of pelagic Polychaeta endemic to any hydrological zone in the South Atlantic Ocean.

2. There are no endemic genera of pelagic Polychaeta in the Antarctic Zone.

3. The following three species of pelagic Polychaeta are endemic to the Antarctic Zone:[1]

*Rhynchonerella bongraini*, *Vanadis antarctica*, *Tomopteris carpenteri*.

*Rhynchonerella bongraini* was collected only in the top 500 m. of water in the Antarctic Zone within the Weddell Drift, East Wind Drift and the upper layers of the Warm Deep Water.

*Vanadis antarctica* probably occurs in all water masses in the Antarctic Zone. It is very similar, morphologically, to *V. longissima* and with it may represent two geographical races of one species.

Adult *Tomopteris carpenteri* were found in all explored water masses of the Antarctic Zone. The smallest specimens of this species, however, were collected only around South Georgia.

4. In addition to *Tomopteris carpenteri*, two other species of tomopterids are known from the Antarctic Zone; *T. planktonis* and *T. septentrionalis*. All three species are very closely related and it is possible that the endemic *T. carpenteri* has evolved from one of the others (both cosmopolitan) as an isolated antarctic form. None of these species has a first pair of chaetigers, rosette glands, spur glands or a tail.

5. There are no endemic species of pelagic Polychaeta in the Sub-Antarctic Zone[2], and no species appears to have its northern limit of distribution at the Sub-Tropical Convergence.

6. *Vanadis longissima* is the only species (or geographical race of a species) of pelagic Polychaeta with its southern limit of distribution at the Antarctic Convergence; it was collected only in the Sub-Antarctic, Sub-Tropical and Tropical Zones.

7. The genera *Krohnia*, *Alciopa*, *Naiades* and *Lopadorhynchus* have not been collected south of the Sub-Tropical Convergence; they may be confined to warmer waters.

[1] *Antinoë pelagica* Monro, 1930, is known only from two records in the Antarctic Zone; these are insufficient to warrant listing this species as endemic.

[2] *Tomopteris kempi* was collected only at St. 4 very close to the Sub-Tropical Convergence, either in the Sub-Tropical or Sub-Antarctic Zone. If future collections show it to be confined to the latter it will be the only known endemic Sub-Antarctic pelagic polychaete.

8. The following species have been found only to the north of the Sub-Tropical Convergence. It is evident that most of them, and probable that all of them, are limited to the south by this boundary though the evidence is not conclusive for some of the scarcer species: *Tomopteris ligulata*, *T. krampi*, *T. elegans*, *T. apsteini*, *T. nisseni*, *Vanadis formosa*, *V. crystallina*, *Rhynchonerella angelini*, *Krohnia lepidota*, *Alciopa reynaudii*, *Naiades cantrainii*, *Travisiopsis lobifera*, *T. lanceolata*, *Lopadorhynchus brevis*, *L. uncinatus*, *L. krohnii*.

All these species have also been reported from the North Atlantic Ocean, where the majority of them appear to be restricted in their northerly distribution by a surface hydrological boundary, the Secondary Polar Front or Labrador Front (Böhnecke, 1938), approximating to the Sub-Tropical Convergence in the South Atlantic. Böhnecke distinguished the Secondary Polar Front by a temperature of 15° C. in summer and 9° C. in winter, extending along the cold-wall region in the left bank of the Gulf Stream to approximately 53° N. in 30° W. To the east of this position, around the British Isles and North-west Europe, the disposition of the land masses makes it difficult to distinguish a convergence.[1]

Collections from the North Atlantic Ocean have not been available in quantity for examination, but in addition to the material in the British Museum (Nat. Hist.) reported by Monro (1939*a*), I have consulted the work of the following authors, who have recorded pelagic polychaetes from near the Secondary Polar Front and/or north of it about the Polar Front: Reibisch (1895), Apstein (1900), Huntsman (1921), Wesenberg-Lund (1935, 1936), Treadwell (1943, 1948), Støp-Bowitz (1948), Wesenberg-Lund (1950*b*, 1953), Grainger (1954).

In these references I can find no record of the following species from north of the Secondary Polar Front in the North Atlantic Ocean: *Tomopteris ligulata*, *T. elegans*, *T. apsteini*, *Vanadis formosa*, *V. crystallina*, *Krohnia lepidota*, *Alciopa reynaudii*, *Naiades cantrainii*, *Travisiopsis lobifera*, *Lopadorhynchus uncinatus*, *L. brevis*, *L. krohnii*.

The water circulation in the North Atlantic Ocean is much more complicated than south of the Equator, but although I have made no attempt to interpret distribution in depth, it is significant that these species are restricted by somewhat similar surface hydrological conditions to those which limit their movement in the South Atlantic Ocean.

The remaining species, *Tomopteris nisseni*, *T. krampi*, *Rhynchonerella angelini*, and *Travisiopsis lanceolata* range northwards beyond the Secondary Polar Front in the North Atlantic Ocean—in brief this front is no barrier to them. No endemic pelagic polychaetes are known from arctic waters, which implies that there is a constant influx of more southerly populations maintaining the homogeneity of the species over a wide area and preventing the evolution of endemic forms. It is possible therefore that the endemic antarctic *Tomopteris carpenteri* may be represented in the arctic fauna by *T. nisseni* and *T. krampi*. Similarly the endemic antarctic *Rhynchonerella bongraini* corresponds to *R. angelini*. Likewise, although the genus *Travisiopsis* is not represented by an endemic species in the Antarctic Zone the species *T. coniceps* occurs only in southern waters and its corresponding species in arctic waters is *T. lanceolata*.

9. The following species were collected in all hydrological zones in the South Atlantic Ocean: *Tomopteris planktonis*, *T. septentrionalis*, *Typhloscolex mülleri*, *Travisiopsis levinseni*, *Pelagobia longicirrata*.

Of these, *Tomopteris planktonis*, *T. septentrionalis* and *Travisiopsis levinseni* were collected in all explored water masses but never in abundance. Many more samples are needed before their distribution can be accurately analysed.

[1] East of 53° N., 30° W., where no clear boundary can be distinguished, Southern (1911) has reported *Vanadis formosa* from stations with surface temperatures between 12° and 16·3° C. and *Alciopa reynaudii* as *Greefia celox* from stations with surface temperatures between 10·5 to 11·15° C.

*Typhloscolex mülleri* was collected throughout the year in the Antarctic Deep Water, migrating to depth in winter. A few records from the surface layers in summer suggest that at this season this species may also inhabit the Weddell Drift. In the Sub-Antarctic Zone *T. mülleri* was collected in Antarctic Intermediate Water and Warm Deep Water; and in the Sub-Tropical and Tropical Zones in South Atlantic Central Water, Antarctic Intermediate Water and possibly in Tropical Surface Water.

*Pelagobia longicirrata* was collected in all explored water masses of the South Atlantic, except in Sub-Antarctic Surface Water north of 45° S. on the Greenwich Meridian. In the Antarctic and Sub-Antarctic Zones, this species was collected in abundance in summer, from depths of 100 m. to the surface, between the Ice Edge and 45° S., where a minor boundary seems to limit its northerly movement. Deacon (1945) has suggested that this boundary separates well-mixed water in the southern half of the Sub-Antarctic Zone from more stably stratified water in the northern half; it may segregate a southern population of *Pelagobia longicirrata* which inhabits the surface layers for feeding (and/or breeding) purposes. In the Antarctic and Sub-Antarctic Zones, *P. longicirrata* migrates to depth in winter.

10. The following species are widespread in distribution, but were never collected in abundance. More collections are required before their distribution can be comprehensively analysed: *Maupasia caeca*, *Travisiopsis coniceps*, *Lagisca hubrechti*.

11. *Circulation.* It has been repeatedly found throughout this work that species which occur at depth are limited in their distribution by surface hydrological boundaries. Restriction in range may be maintained by migration between water masses moving in opposite directions. Throughout the Sub-Tropical and Tropical Zones, species which were not collected south of the Sub-Tropical Convergence could remain in this environment by migrating between southerly flowing South Atlantic Central Water, northerly flowing Antarctic Intermediate Water and/or southerly moving Warm Deep Water. Observations on the life histories of these species would help in understanding their distribution. Surface currents throughout these zones set up an anti-clockwise circulation which would also restrict the southerly movement of the species.

It is probable that most cosmopolitan pelagic polychaetes enter the Antarctic and Sub-Antarctic Zones in the southerly moving Warm Deep Water. Vertical migration in the Antarctic Zone to Antarctic Surface Water together with movement within this layer, until it sinks to form the northerly flowing Antarctic Intermediate Water, would allow these species to circulate throughout the South Atlantic. Within the Antarctic Zone a closed circulation between Antarctic Surface Water and Warm Deep Water is the simplest explanation of zonal movement, but endemic antarctic species and antarctic populations of cosmopolitan species are undoubtedly affected by much more complex circumpolar influences.

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# APPENDIX I

## VERTICAL N 70 V NETS ONLY

N.B. Depths in heavy type indicate hauls made between sunset and sunrise. Samples sorted by the staff of the N.I.O. and recorded on the Plankton Analysis Sheets. The tables include all the species collected except *Maupasia caeca* (see p. 242) and *Travisiopsis coniceps* (see p. 245).

Table *a*. R.R.S. 'William Scoresby'. Sts. WS 137–143, Falkland Islands to South Georgia. Sts. WS 144–190, South Georgia Survey, February–March 1928.

Table *b*. R.R.S. 'Discovery II'. Sts. 300–358, South Georgia Survey, January–February 1930.

Table *c*. R.R.S. 'Discovery II'. 0° Line: Sts. 1772–1782, May–June 1936. Sts. 2010–2027, March–April 1937. Sts. 2311–2322, April 1938. Sts. 2355–2501, July–December 1938. Sts. 2530–2547, January 1939.

### Table *a*. *R.R.S. 'William Scoresby'. Sts. WS 137–143, Falkland Island to South Georgia. Sts. WS 144–190, South Georgia survey, February–March 1928*

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris plank-tonis | Tomopteris septen-trionalis | Tomopteris (*unidentifiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. WS 137**, 8–9. ii. 28 | **50–0** | — | 3 | — | — | — | — | — | — |
| 52° 08′ 00″ S., 54° 55′ 00″ W. | **100–50** | — | 9 | — | — | — | 14 | — | — |
| | **250–90** | — | 6 | — | — | — | 18 | — | — |
| | **500–250** | — | — | — | 3 | — | — | — | — |
| | **750–500** | — | — | — | — | — | — | — | — |
| | **1000–750** | — | 4 | — | — | — | 2 | 2 | 1 |
| **St. WS 138**, 9. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 52° 36′ 00″ S., 52° 16′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 5 | — | 2 | — | — | — | — |
| | 500–250 | — | 12 | — | — | — | 7 | — | — |
| | 750–390 | — | — | — | — | — | — | — | — |
| | 1000–710 | — | 8 | — | 1 | — | — | 3 | — |
| **St. WS 139**, 10. ii. 28 | 50–0 | — | 1 | — | — | — | — | — | — |
| 53° 00′ 00″ S., 49° 50′ 00″ W. | 100–50 | — | 13 | — | 1 | — | — | 1 | — |
| | 250–100 | — | 5 | — | 1 | — | — | — | — |
| | **500–200** | — | 10 | — | — | — | — | 3 | — |
| | **750–500** | — | 2 | — | — | — | — | 1 | — |
| **St. WS 140**, 11. ii. 28 | 50–0 | — | 3 | — | — | — | — | — | — |
| 53° 17′ 00″ S., 47° 02′ 00″ W. | 100–50 | — | 39 | — | — | — | — | 1 | — |
| | 250–90 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 7 | — | — | — | — | — | — |
| | 750–460 | — | — | — | — | — | — | 1 | — |
| | 1000–750 | — | 9 | — | — | — | — | 2 | — |
| **St. WS 141**, 13. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 32′ 00″ S., 44° 52′ 00″ W. | 100–50 | — | 11 | — | — | — | — | — | — |
| | 250–100 | — | 149 | — | — | — | — | — | — |
| | 500–250 | — | 60 | 3 | 1 | — | — | — | — |
| | 750–490 | — | 3 | 1 | — | — | — | 7 | — |
| | 1000–750 | — | 30 | — | — | — | 3 | — | 1 |
| **St. WS 142**, 14. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 33′ 00″ S., 42° 03′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 210–100 | — | — | — | — | — | — | — | — |
| **St. WS 143**, 14–15. ii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 58′ 00″ S., 40° 30′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| [Sts. WS 137 to WS 142 are | **250–100** | — | 19 | — | — | — | — | — | — |
| between the Falkland Islands | **500–240** | — | 10 | — | — | — | — | — | — |
| and South Georgia] | **750–470** | — | 6 | 5 | — | — | — | 4 | 2 |
| | **1000–710** | — | 5 | — | — | 1 | 1 | 1 | — |

Table *a* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. WS 144**, 19. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 08′ 00″ S., 36° 10′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 270–100 | — | — | — | — | — | — | — | — |
| **St. WS 145**, 19. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 00′ 00″ S., 36° 00′ 00″ W. | 100–50 | — | 1 | — | — | — | — | — | — |
| | 275–100 | 1 | 12 | — | — | — | — | — | — |
| **St. WS 146**, 19. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 50′ 00″ S., 35° 50′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 1 | 1 | — | — | — | — | — |
| | 500–250 | 1 | — | — | — | — | — | — | — |
| | 750–500 | — | 1 | — | — | 1 | 2 | 2 | — |
| | 1000–750 | — | 3 | — | — | — | 1 | — | — |
| **St. WS 147**, 21. ii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 50′ 00″ S., 35° 50′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — | — |
| **St. WS 149**, 22. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 32′ 00″ S., 35° 22′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | 1 | — | — | — | — | — | — | — |
| | 500–250 | — | 2 | — | — | — | — | — | — |
| | 750–500 | — | 3 | — | — | — | 1 | 2 | — |
| | 1000–750 | — | 9 | — | — | — | — | — | — |
| **St. WS 151**, 22. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 17′ 00″ S., 35° 08′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | — | — | — |
| | 750–450 | — | 10 | — | 1 | — | — | 13 | — |
| | 1000–750 | — | 6 | — | — | — | 1 | — | — |
| **St. WS 154**, 26. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 00′ 00″ S., 36° 52′ 00″ W. | 100–50 | — | — | — | — | — | — | 2 | — |
| **St. WS 156**, 26. ii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 40′ 00″ S., 36° 52′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **200–100** | — | 3 | — | — | — | — | — | — |
| **St. WS 158**, 27. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 20′ 00″ S., 36° 52′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 2 | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | — | 3 | — |
| **St. WS 160**, 27. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 00′ 00″ S., 36° 52′ 00″ W. | 100–50 | — | 8 | — | — | — | — | — | — |
| | 250–100 | — | 2 | 1 | — | — | — | — | — |
| | 500–250 | — | 2 | — | — | — | — | 1 | — |
| **St. WS 163**, 29. ii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 54′ 00″ S., 38° 18′ 00″ W. | 80–50 | — | 20 | — | — | — | — | — | — |
| **St. WS 164**, 29. ii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 49′ 00″ S., 38° 32′ 00″ W. | **100–50** | — | 1 | — | — | — | — | — | — |
| | **140–100** | — | 2 | — | — | — | — | — | — |
| **St. WS 165**, 1. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 44′ 00″ S., 38° 46′ 00″ W. | **100–50** | — | 25 | — | — | — | — | — | — |
| | **150–100** | — | 11 | — | — | — | — | — | — |
| **St. WS 166**, 1. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 36′ 00″ S., 39° 08′ 00″ W. | 100–50 | — | 1 | — | — | — | — | — | — |
| | 140–100 | — | — | — | — | — | — | — | — |

Table *a* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. WS 167**, 1. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 31′ 00″ S., 39° 22′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 3 | 1 | — | — | — | 1 | — |
| | 460–250* | — | — | — | — | — | — | 1 | — |
| **St. WS 168**, 1. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 26′ 00″ S., 39° 36′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| **St. WS 169**, 6. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 36′ 00″ S., 35° 40′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. WS 171**, 6. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 36′ 00″ S., 35° 00′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | 1 | — | — | — | — | — |
| **St. WS 173**, 6–7. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 36′ 00″ S., 34° 25′ 00″ W. | **100–50** | — | 1 | — | — | — | — | — | — |
| | **250–100** | — | 14 | — | — | — | — | — | — |
| | **500–250** | — | 4 | — | — | — | — | — | — |
| **St. WS 175**, 7. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 36′ 00″ S., 33° 50′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | — | — | — |
| **St. WS 178**, 7. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 10 miles S.E., of Cooper Island | 100–50 | — | — | — | — | — | — | — | — |
| **St. WS 179**, 7. iii. 28 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 08′ 00″ S., 35° 20′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. WS 180**, 7. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 55° 18′ 00″ S., 35° 10′ 00″ W. | **100–50** | — | 7 | — | — | — | — | — | — |
| **St. WS 182**, 8. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 55° 30′ 00″ S., 34° 50′ 00″ W. | **100–50** | — | 6 | — | — | — | — | — | — |
| | **250–100** | — | 8 | — | — | — | — | — | — |
| | **500–250** | — | 1 | 1 | — | — | — | — | — |
| | **750–520** | — | — | — | — | — | — | — | — |
| | **1000–750** | — | 20 | — | — | — | 2 | — | — |
| **St. WS 189**, 9. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 30′ 00″ S., 38° 35′ 00″ W. | | | | | | | | | |
| **St. WS 190**, 10. iii. 28 | **50–0** | — | — | — | — | — | — | — | — |
| 55 miles N.W. of Bird Island | **100–50** | — | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | — | — | — |
| | **750–500** | — | — | — | — | — | — | 1 | — |
| | 750–0† | 2 | — | — | — | — | — | 3 | — |
| | 1000–0† | 4 | — | — | — | — | — | 1 | — |

* One adult *T. carpenteri*.

† Depths from Plankton Analysis Sheets, not from Station Lists.

Table *b*. *R.R.S. 'Discovery II'. Sts. 300–358, South Georgia survey, January–February 1930*

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 300**, 20. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 52° 26′ 30″ S., 37° 14′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 13 | 1 | — | — | 2 | 1 | — |
| | 750–500 | — | 14 | — | — | — | — | 2 | — |
| | 1000–750 | — | 7 | — | — | — | — | — | — |
| **St. 301**, 20–21. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 52° 36′ 30″ S., 37° 14′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | 5 | 1 | — | 1 | 5 | 2 | — |
| | **750–500** | — | 12 | — | 1 | — | 3 | — | — |
| | **1000–750** | — | 5 | — | — | 1 | — | 1 | — |
| **St. 302**, 21. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 52° 46′ 30″ S., 37° 12′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 5 | 1 | — | — | — | — | — |
| | 500–250 | — | 6 | — | — | — | 3 | 1 | — |
| | 750–500 | — | 10 | — | — | — | 5 | 4 | — |
| | 1000–750 | — | 8 | — | — | — | 2 | 1 | — |
| **St. 303**, 21. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 00′ 00″ S., 37° 11′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 7 | — | — | — | 3 | 1 | — |
| | 750–500 | — | 39 | — | — | — | — | 2 | — |
| | 1000–750 | — | 26 | — | — | — | 1 | — | — |
| **St. 304**, 21. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 06′ 00″ S., 37° 14′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 2 | — | — | — | — | 1 | — |
| | 750–500 | — | 11 | — | — | — | 2 | 2 | — |
| | 1000–750 | — | 21 | — | — | — | — | — | — |
| **St. 305**, 21–22. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 17′ 00″ S., 37° 10′ 00″ W. | **100–50** | — | — | — | — | — | 1 | — | — |
| | **250–100** | — | — | — | — | — | 1 | — | — |
| | **500–250** | — | 8 | — | — | — | 1 | 1 | — |
| | **750–500** | — | 9 | — | — | — | 2 | — | — |
| | **1000–750** | — | 8 | — | — | — | 2 | — | — |
| **St. 306**, 22. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 28′ 00″ S., 37° 07′ 00″ W. | **100–50** | — | 1 | — | — | — | — | — | — |
| | **250–100** | — | 1 | — | — | — | — | — | — |
| | **500–250** | — | 5 | — | — | — | — | 1 | — |
| | **750–500** | — | 16 | — | — | — | 1 | 1 | — |
| **St. 307**, 22. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 36′ 00″ S., 37° 04′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 180–100 | — | 12 | — | — | — | — | — | — |
| **St. 308**, 24. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 07′ 15″ S., 36° 24′ 30″ W. | 100–50 | — | 4 | — | — | — | — | — | — |
| **St. 309**, 24. i. 30 | 50–0 | — | 8 | — | — | — | — | — | — |
| 54° 00′ 30″ S., 36° 12′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 240–100 | — | 74 | — | — | — | — | — | — |
| **St. 310**, 24. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 53′ 30″ S., 36° 00′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 145–100 | — | — | — | — | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris plankstonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 311**, 24. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 47′ 00″ S., 35° 48′ 30″ W. | 100–50 | — | 6 | — | — | — | — | — | — |
| | 250–100 | — | 12 | — | — | — | — | — | — |
| | **500–250*** | — | — | — | — | — | — | — | — |
| | **690–500** | — | 69 | — | — | — | — | — | — |
| **St. 312**, 24–25. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 39′ 45″ S., 35° 37′ 30″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **220–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | — | — | — |
| **St. 313**, 25. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 32′ 30″ S., 35° 24′ 30″ W. | 100–50 | — | 48† | 1† | — | — | 2† | — | — |
| | 250–100 | — | 19 | 1 | 1 | — | 3 | — | — |
| | 500–250 | — | 4 | — | — | — | — | 1 | — |
| | 750–500 | — | 2 | — | 1 | — | — | — | — |
| | 1000–750 | — | 1 | — | — | — | — | — | — |
| **St. 314**, 29. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 56′ 00″ S., 37° 14′ 00″ W. | 100–50 | — | 2 | — | — | — | — | — | — |
| **St. 315**, 29. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 46′ 00″ S., 37° 14′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 150–100 | — | 58† | 1† | — | — | — | — | — |
| **St. 316**, 29. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 54′ 30″ S., 38° 01′ 00″ W. | 100–50 | — | 12 | — | — | — | — | — | — |
| **St. 317**, 29. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 47′ 15″ S., 38° 12′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 20 | — | — | — | — | — | — |
| **St. 318**, 29. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 39′ 00″ S., 38° 24′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 150–100 | — | 28‡ | — | — | — | — | — | — |
| **St. 319**, 29–30. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 37′ 00″ S., 38° 39′ 30″ W. to | **100–50** | — | — | — | — | — | — | — | — |
| 53° 33′ 30″ S., 38° 37′ 00″ W. | **250–100** | — | — | — | — | — | — | 1 | — |
| | **500–250** | — | — | — | — | — | 9 | 1 | — |
| | **750–500** | — | — | — | — | — | — | — | — |
| | **1000–750** | — | — | — | 1 | — | — | — | — |
| **St. 320**, 30. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 10′ 30″ S., 39° 44′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 4 | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | — | 1 | — |
| | 750–500 | — | 1 | — | — | — | — | — | — |
| | 1000–750 | — | — | — | — | — | — | — | — |
| **St. 321**, 30–31. i. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 17′ 00″ S., 39° 31′ 00″ W. | **100–50** | — | — | — | — | — | 1 | — | — |
| | **250–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | — | 2 | — |
| | **750–500** | — | 3 | — | — | — | 1 | 1 | — |
| | **1000–750** | — | 1 | — | — | — | — | — | — |
| **St. 322**, 31. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 24′ 30″ S., 39° 17′ 30″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 53° 27′ 00″ S., 29° 22′ 00″ W. | 250–100 | — | 1 | — | — | — | — | 1 | — |
| | 500–250 | — | — | — | — | — | 1 | 1 | — |
| | 750–500 | — | 7 | — | 1 | — | — | — | — |
| | 1000–750 | — | 3 | — | — | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Depth* (*m.*) | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 323**, 31. i. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 28′ 00″ S., 38° 55′ 00″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 53° 29′ 00″ S., 38° 55′ 30″ W. | 250–100 | 1 | — | — | — | — | 1 | — | — |
| | 500–250 | — | 3 | — | 1 | — | 1 | 1 | — |
| | 750–500 | — | 10 | — | — | — | — | — | — |
| | 1000–750 | — | 1 | — | — | — | 1 | — | — |
| **St. 324**, 1. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 56′ 00″ S., 39° 57′ 00″ W. to | 100–50 | — | 2† | — | — | — | — | — | — |
| 54° 56′ 00″ S., 40° 01′ 00″ W. | 250–100 | — | 3† | — | — | — | — | — | — |
| | 500–250 | — | 14† | — | — | — | 1† | 1† | — |
| | 750–500 | — | 2† | — | — | — | 1† | — | — |
| | 1000–750 | — | 14† | — | — | — | 1† | 1† | — |
| **St. 325**, 1. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 53′ 00″ S., 39° 40′ 00″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 54° 51′ 00″ S., 39° 37′ 00″ W. | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | 1 | 1 | — |
| | 750–500 | — | 2 | — | — | — | — | 1 | — |
| | 1000–750 | — | 2 | — | — | — | 1 | — | — |
| **St. 326**, 2. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 33′ 00″ S., 38° 29′ 30″ W. to | **100–50** | — | — | — | — | — | — | — | — |
| 54° 32′ 30″ S., 38° 21′ 00″ W. | **200–100** | — | 3 | — | — | — | — | — | — |
| **St. 327**, 2. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 26′ 30″ S., 38° 06′ 00″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 54° 25′ 00″ S., 38° 03′ 00″ W. | 200–100 | — | — | — | — | — | — | — | — |
| **St. 328**, 2. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 20′ 30″ S., 37° 42′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. 331**, 2. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 40′ 00″ S., 38° 52′ 30″ W. | 100–50 | — | 4 | — | — | — | — | — | — |
| | 200–100 | — | 11† | — | — | — | 1† | — | — |
| **St. 332**, 2–3. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 44′ 30″ S., 39° 09′ 00″ W. | **100–50** | — | — | — | — | — | — | — | — |
| | **250–100** | — | 3 | — | 1 | 2 | — | — | — |
| **St. 333**, 3. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 48′ 30″ S., 38° 24′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 3† | — | — | — | 2† | 1† | — |
| **St. 334**, 4. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 43′ 00″ S., 36° 51′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 6 | — | — | — | — | — | — |
| | 750–500 | — | 11 | — | — | — | 1 | — | — |
| | 1000–750 | — | 5 | — | — | — | — | — | — |
| **St. 335**, 4–5. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 55° 33′ 00″ S., 36° 49′ 30″ W. | **100–50** | — | 1 | — | — | — | 1 | — | — |
| | **250–100** | — | 27 | 1 | — | — | — | — | — |
| | **500–250** | — | 9 | — | — | — | — | 2 | — |
| | **750–500** | — | 1 | — | — | — | — | — | — |
| | **1000–0** | — | 14† | — | — | — | — | — | — |
| **St. 336**, 5. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 21′ 30″ S., 36° 48′ 30″ W. to | 100–50 | — | 11† | — | — | — | — | — | — |
| 55° 20′ 00″ S., 36° 48′ 30″ W. | 250–100 | — | 25§ | — | — | — | 2§ | 1§ | — |
| | 500–250 | — | 7 | — | — | — | 2 | 2 | — |
| | 750–500 | — | 11 | — | 1 | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Depth* (*m.*) | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 337**, 5. ii. 30 | 50–0 | — | — | 1 | — | — | — | — | — |
| 55° 09′ 00″ S., 36° 48′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 45† | — | 1† | — | — | — | — |
| | 500–250 | — | 74 | — | — | 1 | 3 | 1 | — |
| | 750–500 | — | 7 | — | — | — | 1 | — | — |
| | 1000–750 | — | 41 | — | — | — | — | — | — |
| **St. 338**, 5. ii. 30 | 50–0 | — | 2 | — | — | — | 1 | — | — |
| 55° 00′ 30″ S., 36° 46′ 00″ W. | 100–50 | — | 9 | — | — | — | 1 | — | — |
| | 225–100 | — | 55 | 1 | — | — | — | — | — |
| **St. 339**, 5. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 51′ 30″ S., 36° 44′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | 38 | 1 | — | — | — | — | — |
| **St. 340**, 5. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 36′ 00″ S., 36° 40′ 30″ W. | **100–50** | — | — | — | — | — | — | — | — |
| **St. 341**, 5–6. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 54° 43′ 00″ S., 36° 42′ 30″ W. | **100–50** | — | 13 | — | — | — | — | — | — |
| | **230–100** | — | 80 | — | — | — | — | — | — |
| **St. 342**, 7. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 47′ 00″ S., 34° 11′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 24 | 1 | — | — | — | — | — |
| | 750–500 | — | 11 | — | — | — | — | 1 | — |
| **St. 343**, 7. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 40′ 00″ S., 34° 23′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | 5 | 1 | 1 | — | 1 | — | 1 |
| **St. 344**, 7–8. ii. 30 | **50–0** | — | 1 | — | — | — | — | — | — |
| 55° 33′ 00″ S., 34° 35′ 30″ W. to | **100–50** | — | — | — | — | — | — | — | — |
| 55° 29′ 30″ S., 34° 32′ 00″ W. | **250–100** | — | 25† | 1† | — | — | — | — | — |
| | **500–250** | — | 7 | — | 1 | — | — | — | — |
| | **750–500** | — | 15 | — | — | — | — | 1 | — |
| | **1000–750** | — | 8 | — | — | — | — | — | — |
| **St. 345**, 8. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 20′ 00″ S., 34° 47′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 180–100 | — | 3 | — | — | — | 2 | — | — |
| **St. 346**, 8. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 14′ 00″ S., 35° 02′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. 347**, 8. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 55° 08′ 00″ S., 35° 14′ 30″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. 348**, 8. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 53′ 30″ S., 35° 41′ 30″ W. | 90–50 | — | — | — | — | — | — | — | — |
| **St. 349**, 8. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 55° 01′ 00″ S., 35° 27′ 30″ W. | **100–50** | — | — | — | — | — | — | — | — |
| **St. 350**, 9. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 23′ 00″ S., 36° 00′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| **St. 351**, 9. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 21′ 30″ S., 35° 42′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 210–100 | — | 13 | — | — | — | — | 1 | — |
| **St. 352**, 9. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 19′ 00″ S., 35° 24′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 190–100 | — | 15 | — | — | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*juvenile*) | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 353**, 9. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 17′ 30″ S., 35° 06′ 00″ W. | 100–50 | — | — | — | — | — | — | — | — |
| | 250–100 | — | — | 1 | — | — | — | — | — |
| | 500–250 | — | 3 | 1 | — | — | — | 1 | — |
| | 750–500 | — | 23 | — | — | — | — | 1 | — |
| | 1000–750 | — | 13 | — | — | — | 2 | — | — |
| **St. 354**, 9. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 15′ 30″ S., 34° 47′ 30″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 54° 13′ 15″ S., 34° 46′ 00″ W. | 250–100 | — | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | 1 | — | — | — | — |
| | 750–500 | — | 10 | — | — | — | — | — | — |
| | 1000–750 | — | 4 | — | — | — | — | — | — |
| **St. 355**, 9–10. ii. 30 | **50–0** | — | — | — | — | — | 1 | — | — |
| 54° 13′ 30″ S., 34° 18′ 30″ W. to | **100–50** | — | 1 | — | 1 | — | — | — | — |
| 54° 10′ 30″ S., 34° 16′ 30″ W. | **250–100** | — | 77 | 1 | 2 | — | — | 1 | — |
| | **500–250** | — | 9 | — | 1 | — | — | — | — |
| | **750–500** | — | 16 | — | — | 1 | — | — | — |
| | **1000–750** | — | 6 | — | — | — | — | — | — |
| **St. 356**, 10. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 54° 11′ 00″ S., 33° 49′ 00″ W. to | 100–50 | — | 19† | — | — | — | — | — | — |
| 54° 08′ 45″ S., 33° 47′ 30″ W. | 250–100 | — | 9 | 4 | — | — | 3 | — | — |
| | 500–250 | — | 14 | — | — | — | — | 1 | — |
| | 750–500 | — | 11 | — | — | — | — | 1 | — |
| | 1000–750 | — | — | — | — | — | — | — | — |
| **St. 357**, 10. ii. 30 | 50–0 | — | — | — | — | — | — | — | — |
| 53° 07′ 00″ S., 34° 48′ 00″ W. to | 100–50 | — | — | — | — | — | — | — | — |
| 53° 07′ 30″ S., 34° 45′ 30″ W. | 250–100 | — | — | — | — | — | 1 | — | — |
| | **500–250** | — | 2 | — | — | — | — | 1 | — |
| | **750–500** | — | 11 | — | — | — | — | — | — |
| **St. 358**, 11. ii. 30 | **50–0** | — | — | — | — | — | — | — | — |
| 53° 16′ 30″ S., 35° 02′ 30″ W. to | **100–50** | — | — | — | — | — | — | — | — |
| 53° 17′ 00″ S., 34° 58′ 00″ W. | **250–100** | — | — | — | — | — | — | — | — |
| | **500–250** | — | 2 | 1 | 4 | — | — | — | — |
| | **750–500** | — | 7 | — | 1 | — | — | — | — |
| | **1000–750** | — | 14 | — | — | — | 1 | — | — |

* One adult *Tomopteris carpenteri*.

† One-fifth of total sample.

‡ Three-tenths of total sample.

§ Two-fifths of total sample.

Table *c*. *R.R.S.* '*Discovery II*'. *Sts. 1772–1782, May–June 1936. Sts. 2010–2027, March–April 1937. Sts. 2311–2322, April 1938. Sts. 2355–2501, July–December 1938. Sts. 2530–2547, January 1939*

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 1772**, 23. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 36° 01·8′ S., 00° 04·3′ E. to | **100–50** | — | — | — | — | — | — | — |
| 36° 06·8′ S., 00° 05·4′ E. | **250–100** | — | — | — | — | — | 1 | — |
| | **500–250** | — | 1 | — | — | 1 | 1 | — |
| | **750–500** | — | — | — | — | 2 | 1 | — |
| | **1000–750** | — | 1 | — | — | — | — | — |
| | **1500–1000** | — | — | — | — | — | — | — |
| **St. 1773**, 24. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 39° 07′ S., 00° 15·5′ E. to | **100–50** | — | — | — | — | — | — | — |
| 39° 04′ S., 00° 12·5′ E. | **250–100** | — | 1 | — | — | — | — | — |
| | **500–250** | — | — | — | — | 1 | 1 | — |
| | **750–500** | — | — | — | — | — | 7 | — |
| | **1000–750** | — | 1 | — | — | — | 2 | — |
| | **1500–1000** | — | — | — | — | 1 | 4 | 1 |
| **St. 1774**, 25. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 41° 50′ S., 00° 01·7′ E. to | **100–50** | — | — | — | — | — | — | — |
| 41° 54·3′ S., 00° 03·3′ E. | **250–100** | — | — | — | 1 | — | 2 | 1 |
| | **500–250** | — | — | — | — | 1 | 4 | 1 |
| | **750–500** | — | — | — | — | 1 | 3 | 3 |
| **St. 1775**, 27. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 44° 40·3′ S., 00° 33·5′ E. to | **100–50** | — | — | — | — | — | — | — |
| 44° 40′ S., 00° 37′ E. | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | 1 | 4 | 1 |
| | **750–500** | — | — | — | — | — | 4 | — |
| | **1000–750** | — | 2 | — | — | — | 2 | — |
| | **1500–1000** | — | — | — | — | — | — | — |
| **St. 1776**, 28. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 47° 43′ S., 00° 25·5′ E. to | **100–50** | — | — | — | — | — | — | — |
| 47° 48′ S., 00° 23·6′ E. | **250–100** | — | — | — | — | — | — | 1 |
| | **500–250** | — | — | — | — | 1 | — | 2 |
| | **750–500** | — | — | 7 | — | — | 1 | — |
| | **1000–750** | — | 1 | 1 | — | — | 1 | — |
| | **1500–1000** | — | 2 | — | — | — | — | 1 |
| **St. 1777**, 29. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 49° 58·9′ S., 00° 07·1′ E. to | **100–50** | — | — | — | — | — | — | — |
| 50° 02·1′ S., 00° 02·6′ E. | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | 4 | 1 | — |
| | **750–500** | — | — | — | — | — | 3 | — |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | — | — | — | — | — | — |
| **St. 1778**, 30. v. 36 | **50–0** | — | — | — | — | — | — | — |
| 52° 14·7′ S., 00° 1′ W. to | **100–50** | — | — | — | — | — | — | — |
| 52° 12·8′ S., 00° 0·7′ E. | **250–100** | — | — | — | — | — | — | — |
| | **500–250*** | — | — | — | — | — | — | — |
| | **750–500** | — | 1 | — | — | — | 1 | — |
| | **1000–750** | — | 5 | — | — | — | 5 | — |
| | **1500–1000** | — | 4 | — | — | 1 | — | — |
| **St. 1779**, 1. vi. 36 | **50–0** | — | — | — | — | — | — | — |
| 54° 36·2′ S., 00° 05·1′ W. to | **100–50** | 3 | — | — | — | — | — | — |
| 54° 34·8′ S., 00° 04·9′ W. | **250–100** | 3 | 2 | — | 2 | — | — | — |
| | **500–250** | — | 2 | — | — | — | 1 | — |
| | **750–500** | — | 5 | 1 | — | — | — | — |
| | **950–750** | — | 6 | — | — | — | — | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 1781**, 2. vi. 36 | **50–0** | 1 | — | — | 5 | — | — | — |
| 57° 41·8′ S., 00° 19·8′ W. to | **100–50** | 9 | — | — | 11 | — | — | — |
| 57° 44·9′ S., 00° 20·8′ W. | **250–100** | 6 | 10 | — | — | — | 4 | — |
| | **500–250** | — | 9 | 2 | 1 | — | 6 | — |
| | **750–500** | — | 2 | 2 | — | — | — | — |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | 4 | — | — | — | — | — |
| **St. 1782**, 3. vi. 36 | **50–0** | 2 | 1 | — | 1 | — | — | — |
| 58° 44·6′ S., 00° 01·5′ E. to | 100–50 | 1 | 17 | — | — | — | — | — |
| 58° 47·9′ S., 00° 00·7′ E. | 250–100 | 3 | 8 | 2 | 1 | — | 1 | — |
| | 500–250 | — | 14 | — | — | — | 14 | — |
| | 750–500 | — | 5 | — | — | — | — | — |
| | 1000–750 | — | — | — | — | — | — | — |
| | 1500–1000 | — | 6 | — | — | — | 2 | — |
| **St. 2010**, 21. iii. 37 | **50–0** | 3 | — | — | 3 | — | 1 | — |
| 67° 14·3′ S., 00° 39·7′ E. | 100–50 | 5 | 1 | — | — | 1 | — | — |
| | 250–100 | 3 | 1 | — | 7 | — | 2 | — |
| | 500–250 | 2 | 4 | — | 3 | — | 1 | 1 |
| | 750–500 | — | 2 | — | — | 2 | — | — |
| | 1000–750 | — | 2 | — | — | — | — | — |
| | 1500–1000 | — | — | — | — | — | — | — |
| **St. 2012**, 22. iii. 37 | **50–0** | 1 | 33 | — | 3 | — | 1 | — |
| 64° 31·9′ S., 00° 28·59′ E. | **100–50** | 3 | 5 | — | — | — | — | 1 |
| | **250–100** | — | 21 | — | — | 1 | — | 2 |
| | **500–250** | — | 24 | 1 | — | 1 | 3 | — |
| | **750–500** | — | 4 | — | — | 1 | — | 1 |
| | 1000–750 | — | 1 | — | — | — | — | — |
| | 1500–1000 | — | 6 | — | — | — | — | — |
| **St. 2014**, 23. iii. 37 | **50–0** | 4 | 5 | — | — | — | — | — |
| 61° 46·5′ S., 00° 35·1′ E. | **100–50** | 2 | 42 | — | 2 | — | — | — |
| | **250–100** | — | 19 | 1 | — | — | 2 | — |
| | **500–250** | 6 | 1 | — | — | 2 | 6 | — |
| | **750–500** | — | 8 | — | — | 2 | 2 | — |
| | **1000–750** | — | — | — | — | — | 1 | — |
| **St. 2015**, 25. iii. 37 | 50–0 | — | — | — | 1 | — | — | — |
| 59° 23·8′ S., 00° 09·3′ E. | 100–50 | 4 | 3 | — | 3 | — | — | — |
| | 250–100 | 8 | 12 | — | — | — | 1 | — |
| | 500–250 | 11 | 4 | — | — | — | 8 | — |
| | 750–500 | — | 10 | — | — | — | 1 | — |
| | 1000–750 | — | 3 | — | — | — | — | — |
| | 1500–1000 | — | 2 | — | — | — | — | — |
| **St. 2017**, 26. iii. 37 | 50–0 | — | 12 | — | 3 | — | — | — |
| 56° 34·3′ S., 00° 06·7′ E. | 100–50 | 3 | 11 | — | — | — | — | — |
| | 250–100 | 1 | 28 | — | 1 | — | 4 | — |
| | 500–250 | 1 | 11 | 3 | 1 | — | 1 | — |
| | 750–500 | — | 4 | — | — | — | 1 | — |
| | 1000–750 | — | 7 | — | — | — | — | — |
| | 1500–1000 | — | 2 | — | — | — | — | — |
| **St. 2018**, 26. iii. 37 | **50–0** | 7 | 14 | — | 10 | — | — | — |
| 54° 55·3′ S., 00° 11·8′ E. | **100–50** | 4 | — | 1 | — | — | — | — |
| | **250–100** | 2 | 2 | — | 1 | — | 1 | — |
| | **500–250** | — | 3 | — | — | — | — | — |
| | **750–500** | — | 3 | — | — | — | 1 | — |
| | **1000–750** | — | 4 | — | — | — | — | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2020**, 27. iii. 37 | **50–0** | — | — | — | — | — | — | — |
| 52° 25·6′ S., 00° 18·5′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | 2 | — | 3 | — |
| | **750–500** | — | — | — | — | — | 1 | — |
| | **1000–750** | — | 1 | — | — | — | — | — |
| | **1500–1000** | — | 10 | — | 1 | — | — | — |
| **St. 2022**, 28. iii. 37 | **50–0** | — | — | — | — | — | — | — |
| 50° 17·7′ S., 00° 23·1′ E. | **100–50** | — | 3 | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | 1 | — |
| | **750–500** | — | 3 | 2 | — | — | — | — |
| | **1000–750** | — | 4 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2023**, 29. iii. 37 | **50–0** | — | 6 | 3 | — | — | — | — |
| 47° 46′ S., 00° 20·6′ E. | **100–50** | — | 1 | 1 | — | — | — | — |
| | **250–100** | — | — | 2 | — | — | — | — |
| | **500–250** | — | 1 | 5 | — | — | — | — |
| | **750–500** | — | 1 | 8 | — | — | 1 | — |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2024**, 30. iii. 37 | **50–0** | — | — | — | — | — | — | — |
| 45° 01·3′ S., 00° 33·7′ E. | **100–50** | — | 3 | 4 | — | — | — | — |
| | **250–100** | — | — | 2 | — | — | — | — |
| | **500–250** | — | — | — | — | — | 2 | — |
| | **750–500** | — | 2 | 1 | — | — | 2 | — |
| | **1000–750** | — | 1 | 2 | — | — | 3 | 1 |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2025**, 31. iii. 37 | **50–0** | — | — | — | — | — | — | — |
| 42° 10·6′ S., 00° 34·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | 5 | — |
| | **750–500** | — | 1 | — | — | — | 6 | — |
| | **1000–750** | — | — | — | — | — | — | — |
| **St. 2026**, 1. iv. 37 | **50–0** | — | — | — | — | — | — | — |
| 38° 56′ S., 00° 10·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | 1 | — | — | — | 1 | 1 |
| | **750–500** | — | — | — | — | — | — | — |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2027**, 2. iv. 37 | 50–0 | — | 2 | — | — | — | — | — |
| 36° 07·3′ S., 00° 07′ E. | 100–50 | — | 1 | — | — | 1 | — | — |
| | 250–100 | — | — | 2 | — | — | — | — |
| | 500–250 | — | — | — | — | — | — | — |
| | 750–500 | — | — | — | — | — | — | — |
| | 1000–750 | — | 4 | 1 | — | — | — | — |
| | **1500–1000** | — | 2 | 2 | — | — | — | 2 |
| **St. 2311**, 11–12. iv. 38 | **50–0** | — | — | — | — | — | — | — |
| 50° 05·2′ S., 00° 03′ W. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | 1 | — | 1 | 3 | 1 | — |
| | **500–250** | — | — | 1 | — | — | — | — |
| | **750–500** | — | 1 | — | — | 1 | — | — |
| | **1000–750** | — | 3 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | 1 | 2 | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris planktonis | Tomopteris septentrionalis | Tomopteris (*unidentifiable*) | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2313**, 12. iv. 38 | **50–0** | — | — | — | — | — | — | — |
| 52° 27′ S., 00° 29·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | 1 | — | — | — | — | — |
| | **500–250** | — | — | 1 | — | — | 2 | 1 |
| | **750–500** | — | — | — | — | — | — | 1 |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | 4 | — | — | — | — | — |
| **St. 2316**, 14–15. iv. 38 | **50–0** | — | 5 | — | 3 | — | — | — |
| 57° 15·5′ S., 01° 13·4′ E. | **100–50** | — | 3 | — | — | — | — | 1 |
| | **250–100†** | — | 8 | — | — | 1 | — | 1 |
| | **500–250** | — | 7 | 1 | — | 2 | 9 | — |
| | **750–500** | — | 3 | — | — | 1 | — | — |
| | **1000–750** | — | 4 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2318**, 15–16. iv. 38 | **50–0** | — | 45 | — | — | 1 | 3 | — |
| 58° 58·7′ S., 01° 00′ E. | **100–50** | — | 5 | — | — | — | — | — |
| | **250–100** | — | 14 | — | — | 2 | — | — |
| | **500–250** | — | 8 | — | — | — | 5 | — |
| | **750–500** | — | 2 | — | — | — | — | — |
| | **1000–750** | — | — | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2320**, 16–17. iv. 38 | **50–0** | 10 | 4 | — | — | — | 1 | — |
| 61° 10·6′ S., 00° 43·7′ E. | **100–50** | 2 | 8 | — | — | — | — | — |
| | **250–100** | 5 | 12 | — | — | — | — | — |
| | **500–250** | 1 | 3 | 3 | — | — | 6 | 1 |
| | **750–500** | — | 1 | 1 | — | 1 | 1 | — |
| | **1000–750** | — | 1 | — | — | — | 1 | — |
| | **1500–1000** | — | 2 | — | — | — | 2 | — |
| **St. 2322**, 17–18. iv. 38 | **50–0** | 3 | 2 | — | — | — | — | — |
| 63° 53′ S., 00° 24·4′ E. | **100–50** | 10 | 8 | — | 1 | — | — | — |
| | **250–100** | 9 | 10 | — | — | — | 1 | — |
| | **500–250** | 1 | 14 | — | — | 3 | 1 | — |
| | **750–500** | — | 14 | — | — | — | 6 | — |
| | **1000–750** | — | 3 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |
| **St. 2355**, 6–7. vii. 38 | **50–0** | — | — | — | 1 | — | — | — |
| 39° 51·4′ S., 01° 06·8′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | 4 | — | — | 3 | — |
| | **750–500** | — | — | — | — | — | 4 | — |
| | **1000–750** | — | — | — | — | — | 1 | — |
| | **1500–1000** | — | 2 | — | — | 1 | 2 | — |
| **St. 2356**, 7. vii. 38 | **50–0** | — | — | — | — | — | — | — |
| 42° 56·8′ S., 01° 21·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | 1 | — |
| | **750–500** | — | 2 | — | — | — | 4 | — |
| | **1000–750** | — | 1 | — | — | — | 1 | — |
| | **1500–1000** | — | 2 | — | — | — | 4 | — |
| **St. 2357**, 8–9. vii. 38 | **50–0** | — | — | — | — | — | — | — |
| 45° 51·4′ S., 01° 18·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | 2 | 3 | — |
| | **750–500** | — | 2 | — | — | — | 4 | — |
| | **1000–750** | — | 7 | — | — | — | 1 | — |
| | **1500–1000** | — | 10 | — | — | — | — | — |

Table *c* (*cont*).

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiabile*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2358**, 9. vii. 38 | **50–0** | — | — | — | — | — | — | — |
| 48° 24·6′ S., 00° 51′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | 1 | — | — | 4 | — |
| | **750–500** | — | 1 | — | — | 1 | 3 | — |
| | **1000–750** | — | 4 | — | — | — | 3 | — |
| | **1500–1000** | — | 10 | — | — | — | 2 | 1 |
| **St. 2359**, 10. vii. 38 | **50–0** | — | — | — | — | — | — | — |
| 51° 11·4′ S., 00° 25·2′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | — | — | — | — | — | — |
| | **750–500** | — | 1 | — | — | — | — | 1 |
| | **1000–750** | — | 1 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | 1 | 2 | — |
| **St. 2361**, 11. vii. 38 | **50–0** | — | — | — | — | — | — | — |
| 53° 50·6′ S., 00° 00·8′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | 1 | — | — | — | — | — |
| | **500–250** | — | 18 | 6 | — | — | 2 | — |
| | **750–500** | — | 8 | 1 | — | 2 | 1 | 1 |
| | **1000–750** | — | 7 | — | — | — | 2 | — |
| | **1500–1000** | — | 6 | 1 | — | — | 6 | — |
| **St. 2385**, 10. viii. 38 | **50–0** | — | — | — | — | — | — | — |
| 39° 56·9′ S., 00° 14·1′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | — | — | — | 1 | 1 | — |
| | **500–250** | — | — | — | — | 1 | — | 2 |
| | **750–500** | — | 2 | — | — | — | — | — |
| | **1000–750** | — | — | — | — | 1 | — | — |
| | **1500–1000** | — | — | — | — | 1 | 2 | — |
| **St. 2386**, 12. viii. 38 | 50–0 | — | — | — | — | — | — | — |
| 44° 04·9′ S., 00° 15·4′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | — | — |
| | 750–500 | — | 1 | — | — | — | — | 1 |
| | 1000–750 | — | 1 | — | — | — | 1 | — |
| | 1500–1000 | — | 2 | — | — | — | — | — |
| **St. 2387**, 14. viii. 38 | 50–0 | — | — | — | — | — | — | — |
| 49° 08·2′ S., 00° 41·5′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | 1 | — | — |
| | 750–500 | — | — | — | — | 1 | 1 | — |
| | 1000–750 | — | 2 | — | — | — | 1 | — |
| | 1500–1000 | — | 2 | — | — | 1 | — | — |
| **St. 2389**, 15. viii. 38 | **50–0** | — | — | — | — | — | — | — |
| 52° 35·3′ S., 00° 04·5′ E. | **100–50** | — | — | — | 1 | — | — | — |
| | **250–100** | — | — | — | — | — | — | 1 |
| | **500–250** | — | — | — | — | — | 2 | — |
| | **750–500** | — | 1 | — | — | — | 1 | — |
| | **1000–750** | — | 2 | — | — | — | 1 | — |
| | **1500–1000** | — | 6 | — | — | — | 2 | — |
| **St. 2391**, 16. viii. 38 | **50–0** | — | — | — | — | — | — | — |
| 55° 03·3′ S., 00° 19·1′ E. | **100–50** | — | — | — | 1 | — | — | — |
| | **250–100** | — | — | — | 1 | — | — | — |
| | **500–250** | — | 2 | — | — | — | 2 | — |
| | **750–500** | — | 4 | — | — | — | — | — |
| | **1000–750** | — | 1 | — | — | — | — | — |
| | **1500–1000** | — | 2 | — | — | — | — | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2393**, 17. viii. 38 | **50–0** | — | — | — | — | — | — | — |
| 56° 42·3′ S., 00° 38·3′ E. | **100–50** | — | — | — | 6 | — | — | — |
| | **250–100** | 3 | 1 | — | 1 | 2 | — | — |
| | **500–250** | — | 8 | 1 | — | 2 | — | — |
| | **750–500** | — | 7 | 2 | — | 3 | 6 | 1 |
| | **1000–750** | — | 7 | — | — | — | 1 | — |
| | **1500–1000** | — | 6 | — | — | — | 2 | 1 |
| **St. 2424**, 19. ix. 38 | 50–0 | — | — | — | — | — | — | — |
| 39° 53·7′ S., 00° 38·9′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | 4 | 3 |
| | 750–500 | — | — | — | — | — | 4 | 1 |
| | 1000–750 | — | 1 | — | — | — | 1 | — |
| | 1500–1000 | — | 4 | — | — | — | 2 | — |
| **St. 2425**, 20. ix. 38 | 50–0 | — | — | — | — | — | — | — |
| 43° 28·4′ S., 00° 41·1′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | 3 | 1 |
| | 750–500 | — | 3 | — | — | — | 2 | — |
| | 1000–750 | — | 4 | — | — | — | 1 | — |
| | **1500–1000** | — | 6 | — | — | — | — | — |
| **St. 2492**, 28. xi. 38 | 50–0 | — | — | — | — | — | — | — |
| 40° 12·8′ S., 00° 37·6′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | — | — | — | — | 4 | 2 |
| | 750–500 | — | — | — | — | — | 3 | — |
| | 1000–750 | — | — | — | — | — | — | — |
| | 1500–1000 | — | — | — | — | — | — | 1 |
| **St. 2494**, 30. xi. 38 | 50–0 | — | — | — | — | — | — | — |
| 43° 18·1′ S., 00° 54·6′ E. | 100–50 | — | — | — | — | — | — | — |
| | 250–100 | — | — | — | — | — | — | — |
| | 500–250 | — | 1 | — | — | — | — | 1 |
| | 750–500 | — | — | — | — | — | — | — |
| | 1000–750 | — | — | — | — | — | 3 | — |
| | 1500–1000 | — | 4 | — | — | — | — | — |
| **St. 2495**, 1. xii. 38 | 50–0 | — | — | — | — | — | — | — |
| 47° 11·2′ S., 01° 17·5′ E. | 100–50 | — | 8 | 3 | — | — | — | — |
| | 250–100 | — | 32 | 2 | — | — | — | — |
| | 500–250 | — | — | — | — | — | 1 | — |
| | 750–500 | — | 2 | — | — | — | — | 1 |
| | 1000–750 | — | — | — | — | — | — | — |
| | 1500–1000 | — | 2 | — | — | — | 1 | — |
| **St. 2496**, 2. xii. 38 | **50–0** | — | — | — | — | 1 | — | — |
| 50° 20·7′ S., 01° 03·3′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | 6 | — | — | — | — | — |
| | **500–250** | — | 1 | — | — | — | 5 | — |
| | **750–500** | — | 1 | — | — | — | — | 1 |
| | **1000–750** | — | 1 | — | — | — | — | — |
| | 1500–1000* | — | — | — | — | — | — | — |
| **St. 2498**, 3. xii. 38 | **50–0** | — | 30 | — | — | — | — | — |
| 52° 53·5′ S., 00° 50·3′ E. | **100–50** | — | 14 | — | — | — | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | 1 | — | — | — | 4 | — |
| | **750–500** | — | 5 | — | — | — | — | — |
| | **1000–750** | — | 5 | — | — | — | — | — |
| | **1500–1000** | — | 6 | — | — | — | — | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2501**, 5. xii. 38 | 50–0 | — | 4 | — | — | — | — | — |
| 55° 30·2′ S., 01° 23·7′ E. | 100–50 | 6 | 6 | — | — | 1 | 2 | — |
| | 250–100 | 2 | 1 | — | — | — | 1 | — |
| | 500–250 | 1 | 1 | — | — | — | 1 | 1 |
| | 750–500 | — | 3 | — | — | 1 | — | — |
| | 1000–750 | — | 3 | — | 1 | 1 | — | — |
| **St. 2530**, 11–12. i. 39 | **50–0** | — | — | — | — | — | — | — |
| 39° 03′ S., 02° 35′ E. | **100–50** | — | — | — | — | 2 | — | — |
| | **250–100** | — | — | — | — | — | — | — |
| | **500–250** | — | 8 | — | — | — | 5 | — |
| | **750–500** | — | 2 | — | — | — | 1 | — |
| | **1000–750** | — | 3 | — | — | — | 2 | — |
| | **1500–900** | — | 2 | — | — | — | — | — |
| **St. 2531**, 12. i. 39 | **50–0** | — | — | — | — | — | — | — |
| 42° 07·9′ S., 02° 50·9′ E. | **100–50** | — | — | — | — | — | — | — |
| | **250–100** | — | 2 | — | — | 2 | 1 | — |
| | **500–250** | — | 3 | — | — | 2 | 4 | — |
| | **750–500** | — | 4 | — | — | — | 3 | — |
| | **1000–750** | — | 2 | — | — | 1 | — | — |
| | **1500–1000** | — | 10 | — | — | — | — | — |
| **St. 2532**, 13–14. i. 39 | **50–0** | — | 70 | — | — | — | — | — |
| 45° 18·9′ S., 03° 09·8′ E. | **100–50** | — | 24 | 1 | — | — | 1 | — |
| | **250–100** | — | 25 | — | — | — | 1 | — |
| | **500–250** | — | 24 | — | — | — | 3 | — |
| | **750–500** | — | 5 | — | — | — | 4 | — |
| | **1000–750** | — | — | — | — | — | — | — |
| **St. 2533**, 15. i. 39 | 50–0 | — | — | — | — | — | — | — |
| 48° 58·4′ S., 02° 47·1′ E. | 100–50 | — | 22 | — | — | — | — | — |
| | 250–100 | — | 1 | — | — | — | — | — |
| | 500–250 | — | 5 | — | — | — | 2 | 1 |
| | 750–500 | — | 8 | — | — | 1 | 1 | — |
| | 1000–750 | — | — | — | — | — | — | — |
| | 1500–1000 | — | 6 | — | — | — | — | — |
| **St. 2535**, 16. i. 39 | 50–0 | — | 8 | — | — | 1 | — | — |
| 52° 40·8′ S., 02° 45·4′ E. | 100–50 | — | 144 | — | 1 | — | — | — |
| | 250–100 | — | 59 | — | — | — | 2 | — |
| | 500–250 | — | 10 | — | — | — | 3 | 1 |
| | 750–500 | — | 10 | 2 | 1 | — | 1 | — |
| | 1000–750 | — | 3 | — | — | — | — | — |
| | **1500–1000** | — | 4 | — | — | — | — | — |
| **St. 2538**, 18. i. 39 | 50–0 | — | — | — | — | — | — | — |
| 57° 11·9′ S., 03° 33·7′ E. | 100–50 | 5 | — | — | 4 | — | — | — |
| | 250–100 | 4 | 25 | — | — | 2 | 1 | — |
| | 500–250 | 1 | 40 | — | 1 | — | 8 | — |
| | 750–500 | — | 9 | — | — | 2 | 3 | — |
| | 1000–750 | — | 9 | 1 | — | — | 1 | — |
| **St. 2541**, 19–20. i. 39 | 50–0 | 9 | 4 | — | 6 | — | 1 | — |
| 60° 41·7′ S., 03° 13·9′ E. | 100–50 | 4 | 12 | — | — | 2 | — | — |
| | 250–100 | 2 | 5 | 1 | — | — | 1 | — |
| | 500–250 | — | 10 | — | — | — | 7 | — |
| | 750–500 | — | 9 | — | — | — | 4 | — |
| | 1000–750 | — | 5 | — | — | — | — | — |
| | **1500–1000** | — | 4 | — | — | — | — | — |

Table *c* (*cont.*)

| *Station no., date and position* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomo-pteris planktonis | Tomo-pteris septen-trionalis | Tomo-pteris (*unidenti-fiable*) | Typhlo-scolex mülleri | Travi-siopsis levinseni |
|---|---|---|---|---|---|---|---|---|
| **St. 2543**, 20. i. 39 | 50–0 | 4 | 20 | 1 | 1 | — | 4 | — |
| 63° 24·7′ S., 02° 44·7′ E. | 100–50 | — | 11 | — | — | — | 1 | — |
| | 250–100 | 1 | 3 | 2 | 3 | — | 1 | — |
| | 500–250 | — | 12 | — | 1 | — | 1 | — |
| | 750–500 | — | 18 | — | — | — | 3 | — |
| | 1000–750 | — | 3 | 1 | — | 1 | 1 | — |
| | 1500–1000 | — | 4 | — | — | — | — | — |
| **St. 2545**, 21. i. 39 | 50–0 | 1 | 8 | — | 1 | — | — | — |
| 66° 23·7′ S., 02° 16·2′ E. | 100–50 | 1 | 3 | — | — | — | 1 | — |
| | 250–100 | 4 | 9 | — | — | 4 | 3 | — |
| | 500–250 | — | 8 | 1 | 2 | — | 5 | — |
| | 750–500 | — | 6 | 1 | — | — | 6 | — |
| | 1000–750 | — | 4 | 1 | 1 | — | — | — |
| | **1500–1000** | — | 8 | — | — | 1 | — | — |
| **St. 2547**, 22. i. 39 | 50–0 | — | — | — | — | — | — | — |
| 69° 30·2′ S., 02° 04·7′ E. | 100–50 | — | 8 | — | — | — | — | — |
| | 250–100 | 2 | 70 | — | — | 1 | — | — |
| | 500–250 | — | 28 | — | 5 | — | 9 | — |
| | 750–500 | — | 5 | — | — | — | 2 | — |
| | 1000–750 | — | 8 | — | — | — | — | — |
| | 1500–1000 | — | 6 | — | — | — | — | — |

* Sample lost. † One adult *Tomopteris carpenteri*

# APPENDIX II

## MISCELLANEOUS NETS

*Note.* Not all the hauls at all the stations listed were examined. Depths in heavy type indicate hauls made between sunset and sunrise.

Table *a*. R.R.S. 'Discovery II': 0° Line. Sts. 2010–2027, March–April 1937, N 100 B nets.

Table *b*. South Sandwich Islands Survey. Sts. SS 1–SS 58, November–February 1927–28, N 50, N 70 and N 100 nets.

Table *c*. R.R.S. 'William Scoresby'. South Sandwich Islands to Ice Edge to South Georgia. Sts. WS 536, WS 537, WS 541, WS 544, WS 545, WS 547, WS 552 and WS 555, N 70 and N 100 nets.

Table *d*. R.R.S. 'Discovery II'. Falkland Islands to Ice Edge to South Georgia. Sts. 2291–2302, N 70 B, N 100 nets.

Table *e*. R.R.S. 'Discovery', R.R.S. 'Discovery II'. Cape Town to Bouvet Island. Sts. 100, 102–104, 107, 114, 116–118, 404, 405, 407, 413, 419, 446, 448–455, 459–461, 463–466, N 70, N 100 and TYF nets.

Table *f*. R.R.S. 'Discovery II'. 30° W. line. Sts. 661–699, TYF nets.

Table *g*. R.R.S. 'Discovery'. Falkland Islands to Cape Town. Sts. 69, 71, 72, 74, 78, 85, 87, 89, 247, 250, 254, 256, 257–259, N 70 and TYF nets.

Table *h*. R.R.S. 'Discovery', R.R.S. 'Discovery II'. Cape Verde Islands to and from Cape Town. Sts. 266–268, 270, 273, 276, 282, 287–289, 291, 294, N 100 and TYF nets; Sts. 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, TYF nets; Sts. 2028–2040, 2042, 2044–2048, 2050, 2051, 2053, 2055, 2057, 2059, 2061, 2063–2066, N 100, TYF and N 450 nets; Sts. 2073–2084, TYF nets; Sts. 2627–2630, 2632, 2635, 2636, 2638, 2639–2648, N 50 and TYF nets.

Table *j*. R.R.S. 'Discovery II'. Cape Verde Islands to Falkland Islands. Sts. 701–718, TYF nets.

Table *k*. Miscellaneous stations, all nets.

N.B. All negative results for complete samples in Tables *b*, *c*, *e*, *g*, *h* (Sts. 266–94) and *j* are taken from the Plankton Analysis Sheets prepared by the staff of the Discovery Investigations. Samples in Tables *a*, *d* and *h* (except Sts. 266–294) were sorted by the author. Specimens from Sts. 701–18 picked out on board the ship. Specimens in Tables *j* and *k* preserved separately except where noted. Reference to Tables 20–34 in the text should also be made for some of the species collected.

Table *a*. *0° Line, St. 2010–2027, N 100 B nets only*

| *Station no., date and position* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Travisiopsis levinseni |
|---|---|---|---|---|---|---|
| **St. 2010**, 21. iii. 37 | 105–0 | — | — | — | — | — |
| 67° 14·3′ S., 00° 39·7′ E. | 420–150 | — | — | 18 | — | 2 |
| | 700–400 | — | — | 1 | — | 2 |
| **St. 2011**, 22. iii. 37 | 102–0 | — | — | — | — | — |
| 65° 14·3′ S., 00° 29·7′ E. | | | | | | |
| **St. 2012**, 22. iii. 37 | 106–0 | — | — | 10 | 6 | — |
| 64° 31·9′ S., 00° 28·59′ E. | 420–150 | — | — | — | — | — |
| | 700–400 | — | — | — | — | 1 |
| **St. 2013**, 23. iii. 37 | 118–0 | 1 | — | 1 | 2 | — |
| 62° 43·3′ S., 00° 34·2′ E. | | | | | | |
| **St. 2014**, 23. iii. 37 | **97–0** | 1 | 4 | 17 | — | 1 |
| 61° 46·5′ S., 00° 35·1′ E. | **400–150** | 1 | — | — | 1 | — |
| | **700–450(–0)** | 1 | — | 1 | — | — |
| **St. 2015**, 25. iii. 37 | 119–0 | — | — | — | — | |
| 59° 23·8′ S., 00° 09·3′ E. | 450–150 | — | 2 | 2 | — | — |
| | 800–400 | — | — | 1 | — | — |
| **St. 2016**, 25. iii. 37 | **128–0** | — | — | 7 | — | — |
| 57° 45·9′ S., 00° 04′ E. | | | | | | |
| **St. 2017**, 26. iii. 37 | 130–0 | — | — | 1 | 1 | — |
| 56° 34·3′ S., 00° 06·7′ E. | 500–150 | — | — | 1 | — | — |
| | 850–500 | — | — | — | — | — |
| **St. 2018**, 26. iii. 37 | **130–0** | 1 | — | 63 | 1 | — |
| 54° 55·3′ S., 00° 11·8′ E. | | | | | | |
| **St. 2019**, 27. iii. 37 | 118–0 | — | — | — | — | — |
| 53° 15·4′ S., 00° 16·1′ E. | 450–150 | — | — | — | — | — |
| | 700–400(–0) | 1 | — | — | — | — |
| **St. 2020**, 27. iii. 37 | **123–0** | — | — | — | — | — |
| 52° 25·6′ S., 00° 18·5′ E. | **450–150** | — | — | — | — | — |
| | **750–450** | — | — | — | — | — |
| **St. 2021**, 28. iii. 37 | 153–0 | — | — | — | — | — |
| 51° 01·7′ S., 00° 24·4′ E. | | | | | | |
| **St. 2022**, 28. iii. 37 | **118–0** | — | — | — | — | — |
| 50° 17·7′ S., 00° 23·1′ E. | **450–150** | 1 | — | — | — | — |
| | **700–400** | — | — | — | — | — |
| **St. 2023**, 29. iii. 37 | **120–0** | — | — | — | — | — |
| 47° 46′ S., 00° 20·6′ E. | **450–150** | — | — | — | — | 2 |
| | **750–400** | — | — | — | — | — |
| **St. 2024**, 30. iii. 37 | **100–0** | — | — | — | — | — |
| 45° 01·3′ S., 00° 33·7′ E. | **450–150** | — | — | — | — | 1 |
| | **650–400** | — | — | — | — | — |
| **St. 2025**, 31. iii. 37 | **109–0** | — | — | — | — | — |
| 42° 10·6′ S., 00° 34·2′ E. | **440–150** | — | — | — | — | — |
| | **750–400** | — | — | — | — | — |
| **St. 2026**, 1. iv. 37 | **130–0** | — | — | — | — | — |
| 38° 56′ S., 00° 10·2′ E. | **450–150** | — | — | — | — | — |
| | **750–400** | — | — | — | — | — |
| **St. 2027**, 2. iv. 37 | 78–0 | — | — | — | — | — |
| 36° 07·3′ S., 00° 07′ E. | 310–150 | — | — | — | — | — |
| | 600–400 | — | — | — | — | — |

## Table *b*. *South Sandwich Survey*

| *Station no., date and position* | *Net* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septen-trionalis | Typhlo-scolex mülleri |
|---|---|---|---|---|---|---|---|---|
| **St. SS 1**, 18. xi. 27 | N 70 B | 83–0 | 3 | 2 | — | — | 8 | — |
| 55° 35′ 00″ S., 30° 30′ 00″ W. | N 100 B | 83–0 | — | — | — | — | 2 | — |
| **St. SS 2**, 20. xi. 27 | N 70 B | 50–0 | — | — | — | — | — | — |
| 55° 36′ 00″ S., 30° 33′ 00″ W. | N 70 B | 100–0 | — | — | — | — | — | — |
| | N 70 B | 250–0 | 1 | 1 | — | — | — | — |
| **St. SS 3**, 24. xi. 27 | N 50 V | 100–0 | — | — | — | — | — | — |
| 54° 02′ 00″ S., 31° 22′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | 1 | — | — | — | 3 | — |
| | N 70 V | 250–100 | — | — | — | — | — | — |
| **St. SS 4**, 25. xi. 27 | N 70 B | **102–0** | 5 | — | — | — | 6 | — |
| 54° 03′ 00″ S., 31° 38′ 00″ W. | N 100 B | **102–0** | 1 | — | — | — | 1 | — |
| **St. SS 5**, 25. xi. 27 | N 70 B | **98–0** | 6 | — | — | — | — | — |
| 54° 02′ 00″ S., 31° 40′ 00″ W. | N 100 B | **98–0** | — | — | — | — | 5 | — |
| **St. SS 6**, 29. xi. 27 | N 70 B | **137–0** | 7 | — | 1 | — | 5 | — |
| 54° 20′ 00″ S., 29° 31′ 00″ W. | N 100 B | **137–0** | — | — | 2* | — | 3* | — |
| **St. SS 7**, 29. xi. 27 | N 70 B | **150–0** | — | — | — | 1 | 3 | — |
| 54° 19′ 20″ S., 29° 32′ 40″ W. | N 100 B | **150–0** | — | — | 1 | — | — | — |
| **St. SS 8**, 30. xi. 27 | N 50 V | 100–0 | — | — | — | — | — | — |
| 54° 20′ 00″ S., 29° 31′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | — | — | — | — | — |
| | N 70 V | 250–100 | — | — | — | — | — | — |
| **St. SS 9**, 2. xii. 27 | N 70 B | 58–0 | 1 | 1 | — | — | 18 | — |
| 54° 31′ 00″ S., 29° 40′ 00″ W. | N 100 B | 58–0 | — | — | 3 | — | 14 | — |
| **St. SS 10**, 2. xii. 27 | N 70 B | 100–0 | 1 | — | 1 | — | 3* | — |
| 54° 30′ 20″ S., 29° 38′ 45″ W. | N 100 B | 100–0 | — | — | 1* | — | 6* | — |
| **St. SS 11**, 6. xii. 27 | N 70 B | **84–0** | 6 | — | — | — | 2 | — |
| 54° 31′ 00″ S., 29° 48′ 00″ W. | N 100 B | **84–0** | 2 | — | 1 | — | 6 | — |
| **St. SS 12**, 6. xii. 27 | N 70 B | **123–0** | 4 | — | 1 | — | 8 | — |
| 54° 30′ 20″ S., 29° 50′ 20″ W. | N 100 B | **123–0** | — | — | 1* | — | — | — |
| **St. SS 13**, 8. xii. 27 | N 50 V | 100–0 | — | — | — | — | — | — |
| 54° 22′ 00″ S., 30° 00′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | 1 | 1 | — | 2 | — |
| | N 70 V | 250–100 | 1 | 3 | — | — | 1 | — |
| **St. SS 14**, 11. xii. 27 | N 70 B | 55–0 | 3 | 1 | — | — | — | — |
| 54° 30′ 00″ S., 30° 11′ 00″ W. | N 100 B | 55–0 | 1 | — | 1 | — | 7 | — |
| **St. SS 15**, 11. xii. 27 | N 70 B | **104–0** | 5 | — | — | 1 | 3 | — |
| 54° 22′ 00″ S., 30° 11′ 00″ W. | N 100 B | **104–0** | 5 | — | 2 | — | 9 | — |
| **St. SS 16**, 14. xii. 27 | N 70 B | **104–0** | — | — | — | — | 1* | — |
| 55° 00′ 00″ S., 27° 29′ 00″ W. | N 100 B | **104–0** | — | — | 1* | — | 3* | — |
| **St. SS 17**, 14. xii. 27 | N 70 B | **99–0** | 1 | — | 1* | — | — | — |
| 55° 00′ 00″ S., 27° 43′ 00″ W. | N 100 B | **99–0** | — | — | 1* | — | 4* | — |
| **St. SS 18**, 15. xii. 27 | N 50 V | 100–0 | — | — | — | — | — | — |
| 54° 58′ 00″ S., 27° 32′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | — | — | — | — | — |
| | N 70 V | 250–100 | — | — | — | — | — | — |
| **St. SS 19**, 19. xii. 27 | N 70 B | 137–0 | — | — | 1* | — | — | — |
| 54° 51′ 30″ S., 27° 38′ 00″ W. | N 100 B | 137–0 | — | — | — | — | 2* | — |
| **St. SS 20**, 19. xii. 27 | N 70 B | 100–0 | — | — | — | — | 3 | — |
| 54° 52′ 30″ S., 27° 36′ 30″ W. | N 100 B | 100–0 | — | — | 1 | — | 1* | — |
| **St. SS 21**, 21. xii. 27 | N 50 V | 100–0 | — | — | — | — | — | — |
| 56° 21′ 00″ S., 25° 40′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | — | — | — | 2* | — |
| | N 70 V | 250–100 | — | 3 | — | 1† | 2* | 1 |
| **St. SS 22**, 22. xii. 27 | N 70 B | **95–0** | 4 | — | — | — | 2 | — |
| 55° 56′ 00″ S., 25° 56′ 00″ W. | N 100 B | **95–0** | — | — | — | — | 1 | — |
| **St. SS 23**, 22. xii. 27 | N 70 B | **124–0** | 5 | — | — | — | 7 | — |
| 55° 59′ 00″ S., 25° 56′ 00″ W. | N 100 B | **124–0** | — | — | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Net* | *Depth (m.)* | Rhyncho-nerella bongraini | Pelagobia longi-cirrata | Tomopteris carpenteri (*adults*) | Tomopteris planktonis | Tomopteris septen-trionalis | Typhlo-scolex mülleri |
|---|---|---|---|---|---|---|---|---|
| **St. SS 24**, 24. xii. 27 | N 70 B | 81–0 | 1 | — | — | — | 10 | — |
| 56° 49′ 00″ S., 25° 35′ 00″ W. | N 100 B | 81–0 | — | — | — | — | 15* | — |
| **St. SS 25**, 24. xii. 27 | N 70 B | 62–0 | 3 | 1 | 1 | 2 | — | — |
| 56° 47′ 50″ S., 25° 33′ 00″ W. | N 100 B | 62–0 | — | — | 1 | — | — | — |
| **St. SS 26**, 4. i. 28 | N 70 B | 79–0 | — | — | — | — | — | — |
| 60° 14′ 00″ S., 26° 27′ 00″ W. | N 100 B | 79–0 | — | — | — | — | — | — |
| **St. SS 27**, 4. i. 28 | N 70 B | 104–0 | 1 | — | — | — | — | — |
| 60° 15′ 00″ S., 26° 33′ 00″ W. | N 100 B | 104–0 | — | — | — | — | — | — |
| **St. SS 28**, 11. i. 28 | N 50 V | 100–0 | — | — | — | 1 | — | — |
| 59° 26′ 00″ S., 25° 24′ 00″ W. | N 70 V | 50–0 | 2 | — | — | — | 1 | — |
| | N 70 V | **100–(0)** | 1 | 1 | 1 | — | 1 | — |
| | N 70 V | **250–(0)** | 2 | — | — | — | — | — |
| **St. SS 29**, 13. i. 28 | N 70 B | 97–0 | — | — | 2 | — | 1 | — |
| 60° 05′ 30″ S., 24° 19′ 00″ W. | N 100 B | 97–0 | — | — | — | — | 2 | — |
| **St. SS 30**, 13. i. 28 | N 70 B | 119–0 | — | — | 1 | — | 1 | — |
| 60° 08′ 30″ S., 24° 19′ 00″ W. | N 100 B | 119–0 | — | — | 4 | — | 7 | — |
| **St. SS 31**, 18. i. 28 | N 70 B | 135–0 | — | — | — | — | — | — |
| 60° 59′ 00″ S., 25° 55′ 30″ W. | N 100 B | 135–0 | — | — | 1 | — | — | — |
| **St. SS 32**, 18. i. 28 | N 70 B | 115–0 | — | — | 1* | — | 1* | — |
| 60° 57′ 00″ S., 25° 57′ 30″ W. | N 100 B | 115–0 | — | — | 1* | — | 1* | — |
| **St. SS 33**, 20. i. 28 | N 50 V | 100–0 | — | — | — | — | — | — |
| 60° 52′ 00″ S., 25° 29′ 00″ W. | N 70 V | 50–0 | — | — | — | — | 1* | — |
| | N 70 V | **100 (0)** | — | 1 | — | — | — | — |
| | N 70 V | **250–100** | 3‡ | — | — | — | 2* | — |
| **St. SS 34**, 21. i. 28 | N 70 B | 141–0 | — | — | — | — | 1 | — |
| 60° 51′ 00″ S., 26° 25′ 00″ W. | N 100 B | 141–0 | — | — | — | — | 3 | — |
| **St. SS 35**, 21. i. 28 | N 70 B | **119–0** | 3 | 1 | — | — | — | — |
| 60° 49′ 00″ S., 26° 32′ 00″ W. | N 100 B | **119–0** | — | — | — | — | 1* | — |
| **St. SS 36**, 24. i. 28 | N 70 B | 128–0 | 1 | — | — | — | 2 | — |
| 60° 58′ 00″ S., 26° 20′ 00″ W. | N 100 B | 128–0 | — | — | — | — | — | — |
| **St. SS 37**, 24. i. 28 | N 70 B | 130–0 | — | — | — | — | — | - |
| 61° 00′ 20″ S., 26° 26′ 00″ W. | N 100 B | 130–0 | — | — | — | — | — | — |
| **St. SS 38**, 27. i. 28 | N 50 V | 100–0 | — | — | — | — | — | — |
| 61° 05′ 00″ S., 26° 20′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | — | — | — | — | — |
| | N 70 V | 250–100 | — | — | — | — | — | — |
| **St. SS 39**, 28. i. 28 | N 70 B | 69–0 | 1 | 10 | — | — | 2 | — |
| 61° 14′ 00″ S., 26° 16′ 30″ W. | N 100 B | 69–0 | — | — | — | — | 4 | — |
| **St. SS 40**, 28. i. 28 | N 70 B | 97–0 | 1 | — | — | — | 3 | — |
| 61° 19′ 00″ S., 26° 06′ 00″ W. | N 100 B | 97–0 | — | — | — | — | 3 | — |
| **St. SS 41**, 1. ii. 28 | N 70 B | 137–0 | — | — | — | — | — | — |
| 61° 21′ 30″ S., 26° 25′ 00″ W. | N 100 B | 137–0 | — | — | — | — | — | — |
| **St. SS 42**, 1. ii. 28 | N 70 B | 119–0 | 1 | — | — | — | — | 1 |
| 61° 21′ 30″ S., 26° 20′ 30″ W. | N 100 B | 119–0 | — | — | — | — | — | — |
| **St. SS 43**, 2. ii. 28 | N 50 V | 100–0 | — | — | — | — | — | — |
| 61° 45′ 00″ S., 26° 50′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | 1 | — | — | — | — |
| | N 70 V | 250–100 | 1 | — | — | — | — | — |
| **St. SS 44**, 3. ii. 28 | N 70 B | 110–0 | — | — | — | — | — | — |
| 62° 23′ 00″ S., 27° 04′ 00″ W. | N 100 B | 110–0 | — | — | — | — | 1* | — |
| **St. SS 45**, 3. ii. 28 | N 70 B | 99–0 | — | 1 | — | — | — | — |
| 62° 17′ 45″ S., 27° 15′ 45″ W. | N 100 B | 99–0 | — | — | — | — | — | — |
| **St. SS 46**, 7. ii. 28 | N 70 B | 119–0 | — | — | — | — | — | — |
| 62° 00′ 20″ S., 27° 05′ 00″ W. | N 100 B | 119–0 | — | — | — | — | — | — |
| **St. SS 47**, 7. ii. 28 | N 70 B | **141–0** | 2 | 2 | — | — | — | — |
| 62° 13′ 00″ S., 27° 10′ 00″ W. | N 100 B | **141–0** | — | — | — | — | — | — |

Table *b* (*cont.*)

| *Station no., date and position* | *Net* | *Depth* (*m.*) | Rhynchonerella bongraini | Pelagobia longicirrata | Tomopteris carpenteri (*adults*) | Tomopteris planktonis | Tomopteris septentrionalis | Typhloscolex mülleri |
|---|---|---|---|---|---|---|---|---|
| **St. SS 48**, 11. ii. 28 | N 50 V | 100–0 | — | — | — | — | — | — |
| 62° 45′ 00″ S., 25° 42′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–50 | — | — | — | — | — | — |
| | N 70 V | 250–100 | 1 | 1 | — | — | — | 1 |
| **St. SS 49**, 12. ii. 28 | N 70 B | 141–0 | — | — | — | — | — | — |
| 62° 21′ 30″ S., 24° 02′ 30″ W. | N 100 B | 141–0 | — | — | — | — | — | — |
| **St. SS 50**, 12. ii. 28 | N 70 B | 95–0 | — | — | — | — | — | 1 |
| 62° 19′ 20″ S., 24° 02′ 00″ W. | N 100 B | 95–0 | — | — | — | — | — | — |
| **St. SS 51**, 15. ii. 28 | N 70 B | 110–0 | — | — | — | — | — | — |
| 62° 11′ 30″ S., 21° 30′ 00″ W. | N 100 B | 110–0 | — | — | — | — | — | — |
| **St. SS 52**, 15. ii. 28 | N 70 B | 146–0 | — | 1 | — | — | — | — |
| 62° 15′ 00″ S., 21° 36′ 20″ W. | N 100 B | 146–0 | — | — | — | — | — | — |
| **St. SS 53**, 16. ii. 28 | N 50 V | 100–0 | — | — | — | — | — | — |
| 61° 30′ 00″ S., 23° 20′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | 100–0 | — | — | — | — | 2 | — |
| | N 70 V | 250–100 | 1‡ | — | — | — | — | 1* |
| **St. SS 54**, 20. ii. 28 | N 70 B | **95–0** | — | — | — | — | — | — |
| 60° 59′ 20″ S., 23° 21′ 50″ W. | N 100 B | **95–0** | — | — | — | — | — | — |
| **St. SS 55**, 20. ii. 28 | N 70 B | 155–0 | 1 | — | — | — | 1 | — |
| 61° 01′ 00″ S., 23° 30′ 00″ W. | N 100 B | 155–0 | — | — | — | — | — | — |
| **St. SS 56**, 22. ii. 28 | N 50 V | 100–0 | 1 | — | — | — | 1* | — |
| 61° 49′ 00″ S., 23° 54′ 00″ W. | N 70 V | 50–0 | — | — | — | — | — | — |
| | N 70 V | **100–50** | 2 | — | — | — | — | — |
| | N 70 V | **250–100** | 3 | — | — | — | — | — |
| **St. SS 57**, 23. ii. 28 | N 70 B | 95–0 | — | — | 1* | — | — | — |
| 61° 49′ 30″ S., 23° 28′ 00″ W. | N 100 B | 95–0 | — | — | 1* | — | — | — |
| **St. SS 58**, 23. ii. 28 | N 70 B | 104–**0** | — | — | — | — | 1 | — |
| 61° 55′ 00″ S., 23° 40′ 00″ W. | N 100 B | 104–**0** | — | — | — | — | — | — |

* Monro, 1930. † As *Tomopteris carpenteri* or *T. planktonis*. ‡ As *Rhynchonerella fulgens*.

Table *c*. *South Sandwich Islands to Ice Edge in 68° 53′ S.*

| *Station no., date and position* | *Net* | *Depth* (*m.*) | Tomopteris carpenteri (*adult*) | Vanadis antarctica | Rhynchonerella bongraini | Pelagobia longicirrata | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|
| **St. WS 536**, 24. i. 31 | N 100 B | **102–0** | 5 | — | — | — | — |
| 56° 28′ S., 27° 21′ W. | | | | | | | |
| **St. WS 537**, 25–26. i. 31 | N 70 B | **67–0** | — | 1 | — | — | — |
| 56° 10′ S., 25° 35′ W. | | | | | | | |
| **St. WS 541**, 28. i. 31 | N 100 B | 102–0 | 2 | — | — | — | — |
| 57° 51′ 30″ S., 19° 51′ 30″ W. | | | | | | | |
| **St. WS 544**, 29. i. 31 | N 100 B | **146–0** | 3 | — | — | — | — |
| 60° 59′ S., 17° 50′ W. | | | | | | | |
| **St. WS 545**, 30. i. 31 | N 100 B | 124–0 | 1 | — | — | — | — |
| 61° 51′ S., 17° 15′ W. | | | | | | | |
| **St. WS 547**, 30. i. 31 | N 100 B | **154–0** | 1 | — | — | — | — |
| 62° 40′ S., 17° 02′ W. | | | | | | | |
| **St. WS 548**, 31. i. 31 | N 100 B | 106–0 | 1 | — | — | — | — |
| 64° 07′ S., 15° 38′ W. | | | | | | | |
| **St. WS 549**, 31. i. 31 | N 100 B | **128–0** | 2 | — | — | — | 2 |
| 65° 17′ S., 15° 33′ W. | | | | | | | |
| **St. WS 550**, 1. ii. 31 | N 70 B | 121–0 | — | 1 | — | — | — |
| 66° 51′ 30″ S., 15° 24′ W. | | | | | | | |
| **St. WS 551**, 1. ii. 31 | N 70 B | 121–0 | — | 2 | — | — | — |
| 68° 17′ 30″ S., 14° 26′ 30″ W. | | | | | | | |
| **St. WS 552**, 2. ii. 31 | N 100 B | ? | — | 1 | — | — | — |
| 68° 53′ S., 13° 03′ W. to 68° 50′ S., 13° 03′ W. | | | | | | | |
| **St. WS 555**, 6. ii. 31 | N 100 B | 174–0 | — | — | 3* | 3 | 1† |
| 60° 27′ S., 19° 36′ W. | | | | | | | |

These specimens were reported by Monro, 1936: * As *Callizonella bongraini*, † As *Travisiopsis benhami*.

## Table *d*. *Falkland Islands to Ice Edge to South Georgia*

| *Station no., date and position* | *Net* | *Depth (m.)* | Rhyncho-nerella bongraini | Vanadis antarctica | Vanadis longissima | Pelagobia longi-cirrata | Tomopteris carpenteri (*adult*) | Tomopteris septen-trionalis |
|---|---|---|---|---|---|---|---|---|
| **St. 2291**, 20. iii. 38 | N 100 B | **104–0** | — | — | 1 | — | — | — |
| 53° 02·3′ S., 56° 20·9′ W. | N 70 B | **380–275** | — | — | — | — | — | |
| | N 100 B | **380–275** | — | — | — | — | — | — |
| **St. 2292**, 21–22. iii. 38 | N 100 B | **119–0** | — | — | — | — | — | — |
| 55° 41·2′ S., 53° 31·6′ W. | N 100 B | **375–225** | — | — | — | — | — | — |
| **St. 2293**, 22. iii. 38 | N 100 B | **53–0** | — | — | — | — | — | — |
| 57° 34·9′ S., 51° 06·2′ W. | | | | | | | | |
| **St. 2294**, 23. iii. 38 | N 70 B | 180–0 | — | — | — | — | — | — |
| 58° 44·8′ S., 49° 47·8′ W. | N 100 B | 180–0 | — | — | — | — | — | — |
| **St. 2295**, 23. iii. 38 | N 100 H | **5–0** | — | — | — | — | 2 | — |
| 59° 58′ S., 48° 28·1′ W. | N 70 B | **93–0** | — | — | — | — | 1 | — |
| | N 100 B | **93–0** | — | — | — | — | — | — |
| | N 70 B | **310–160** | — | — | — | — | 1 | — |
| | N 100 B | **310–160** | — | — | — | — | — | |
| **St. 2296**, 24. iii. 38 | N 100 H | **5–0** | — | — | — | — | — | 1 |
| 61° 22·7′ S., 46° 43·1′ W. | N 100 B | **134–0** | — | — | — | — | — | 3 |
| | N 70 B | **240–110** | 3 | — | | 236* | — | — |
| | N 100 B | **240–110** | — | — | | — | — | 5 |
| **St. 2297**, 25. iii. 38 | N 100 H | **5–0** | — | — | — | — | — | — |
| 62° 21·2′ S., 45° 05·3′ W. | N 70 B | 94–0 | — | — | — | — | — | — |
| | N 100 B | 94–0 | — | — | — | — | 3 | — |
| | N 100 B | 490–230 | — | 1 | — | — | 1 | — |
| | N 100 B | 750–0 | — | — | — | — | — | — |
| **St. 2298**, 25. iii. 38 | N 100 H | **5–0** | — | — | — | — | 2 | |
| 61° 09·6′ S., 43° 15·6′ W. | N 70 B | **97–0** | — | — | — | — | 2 | — |
| | N 100 B | **97–0** | — | — | — | — | 1 | — |
| | N 70 B | **340–170** | — | — | — | 8 | — | — |
| | N 100 B | **340–170** | — | — | — | — | — | 1 |
| **St. 2299**, 26. iii. 38 | N 100 H | 5–0 | — | — | — | — | — | — |
| 59° 52·6′ S., 41° 40·4′ W. | N 70 B | 170–0 | — | — | — | — | — | — |
| | N 100 B | 170–0 | — | — | — | — | — | — |
| **St. 2300**, 26. iii. 38 | N 100 H | **5–0** | — | — | — | — | 14 | — |
| 58° 33′ S., 39° 54·7′ W. | N 70 B | **106–0** | — | — | — | — | 8 | — |
| | N 100 B | **106–0** | — | — | — | — | 12 | — |
| | N 70 B | **350–200** | — | — | — | — | — | — |
| | N 100 B | **350–200** | 1 | — | — | 7 | — | — |
| **St. 2301**, 27. iii. 38 | N 100 H | 5–0 | — | — | — | — | 2 | — |
| 57° 14′ S., 38° 13·5′ W. | N 70 B | 135–0 | — | — | — | — | — | — |
| | N 100 B | 135–0 | — | — | — | — | — | — |
| **St. 2302**, 27. iii. 38 | N 100 H | **5–0** | — | — | — | — | — | — |
| 55° 56·3′ S., 36° 42·9′ W. | N 70 B | **103–0** | — | — | — | — | 1 | — |
| | N 100 B | **103–0** | — | — | — | — | — | — |
| | N 70 B | **360–130** | — | — | — | — | — | — |
| | N 100 B | **360–130** | — | — | — | — | — | — |

* One-fifth of sample.

## Table *e*. *Cape Town to Bouvet Island*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Typhloscolex mülleri | Travisiopsis levinseni | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|---|---|
| **St. 100**, 1–4. x. 26 | TYF | 5–0 | — | — | 38 | — | 1 | — | — | — |
| 33° 20′ 00″ S. 15° 18′ 00″ W. | TYF | 225 | — | — | — | — | — | — | — | — |
| to 33° 46′ 00″ S. 15° 08′ 00″ E. | TYF | 310–260 | — | — | 65 | — | — | — | — | — |
| | TYF | 475(–0) | — | — | 116 | — | — | — | — | — |
| | TYF | 550–450 | — | — | 15 | — | — | — | 1 | — |
| | TYF | 675–625 | — | — | — | — | — | — | — | — |
| | TYF | 1000–300 | — | — | — | — | — | — | — | — |
| | TYF | 1000–900 | — | — | — | — | — | — | — | — |
| | TYF | 2000(–0) | — | — | — | — | — | — | — | — |
| | TYF | 2500(–0) | — | — | 137 | — | — | — | — | — |
| | TYF | 2500–2000 | — | — | 32 | — | — | — | 3† | — |
| **St. 102**, 28. x. 26 | N 70 V | 250–100 | — | — | — | — | — | — | — | 1 |
| 35° 29′ 20″ S., 18° 33′ 40″ E. | N 70 V | 500–250 | — | — | 1 | — | — | — | — | 12 |
| | N 70 V | 750–500 | — | 2 | — | — | — | — | — | 4 |
| | N 70 V | 1000–750 | — | — | 4 | — | — | — | — | 1 |
| | N 100 H | 52 | — | — | — | — | — | — | — | — |
| | N 100 H | 104 | — | — | — | — | — | — | — | — |
| **St. 103**, 30. x. 26 | N 70 V | 50–0 | — | — | — | — | — | — | — | 1 |
| 39° 04′ 00″ S., 17° 38′ 00″ E. | N 70 V | 250–100 | — | 1 | — | — | — | 1 | — | — |
| | N 70 V | 500–250 | — | — | — | — | — | — | — | 1 |
| **St. 104**, 31. x. 26 | N 100 H | 56(–0) | — | — | — | — | — | — | — | — |
| 41° 33′ 30″ S., 17° 58′ 00″ W. | | | | | | | | | | |
| **St. 107**, 4. xi. 26 | N 70 V | 250–80 | — | — | — | — | — | — | — | 2 |
| 45° 03′ 00″ S., 17° 03′ 00″ E. | N 70 V | 500–250 | — | 1 | — | — | — | 2 | 1 | 1 |
| | N 70 V | 750–500 | — | — | — | — | — | 4 | 2 | 2 |
| | N 70 V | 1000–750 | — | — | — | — | — | 2 | — | 2 |
| **St. 114**, 12. xi. 26 | N 100 H | 90 | 5* | — | — | — | — | — | — | — |
| 52° 25′ S., 9° 50′ E. | | | | | | | | | | |
| **St. 116**, 14. xi. 26 | N 100 H | 110(–0) | — | — | — | — | — | — | 2‡ | — |
| 54° 30′ 00″ S., 5° 34′ 00″ E. | | | | | | | | | | |
| **St. 117**, 17. xi. 26 | N 70 V | 100–50 | — | — | — | — | — | — | — | 2 |
| About 5 miles N. 72° E. of Bouvet | N 70 V | 250–100 | — | — | — | — | — | — | — | 6 |
| Island, 54° 20′ 40″ S., 3° 48′ 45″ E. | N 70 V | 500–300 | — | — | — | — | — | — | 1 | — |
| | N 70 V | 750–500 | — | — | — | — | — | 1 | 1 | 6 |
| **St. 118**, 19. xi. 26 | N 100 H | 100 | 3* | — | — | | — | — | — | — |
| 53° 07′ S., 1° 26′ W. | | | | | | | | | | |
| **St. 404**, 4. vi. 30 | N 100 B | 100–0 | — | — | — | — | — | — | — | — |
| 35° 34′ S., 15° 00½′ E. | | | | | | | | | | |
| **St. 405**, 4. vi. 30 | TYFB | 1200–0 | — | — | — | — | — | — | — | — |
| 33° 50′ 30″ S., 15° 46′ 00″ E. to | | | | | | | | | | |
| 34° 16′ 00″ S., 15° 02′ 00″ E. | | | | | | | | | | |
| **St. 407**, 12. vi. 30 | TYFB | 220–0 | — | — | — | — | — | — | — | — |
| 35° 13′ S., 17° 50½′ E. to | N 450 H | 900–800 | — | — | — | — | — | — | — | — |
| 34° 57′ S., 17° 48′ E. | | | | | | | | | | |
| **St. 413**, 21. viii. 30 | TYFB | 350–0 | — | — | — | — | — | — | — | — |
| 33° 13′ 00″ S., 15° 46′ 30″ E. | | | | | | | | | | |
| **St. 419**, 30 viii. 30 | N 70 V§ | 50–0 | — | — | — | — | — | — | — | — |
| 36° 29′ 00″ S., 18° 16′ 15″ E. to | N 100 B§ | 84–0 | — | — | — | — | — | — | — | — |
| 36° 29′ 00″ S., 18° 15′ 15″ E. | | | | | | | | | | |
| **St. 446**, 9. x. 30 | N 100 B | 106–0 | — | — | 15¶ | — | — | — | — | — |
| 36° 14′ 00″ S., 16° 09′ 45″ E. | | | | | | | | | | |
| **St. 448**, 10. x. 30 | N 100 B | 161–0 | — | — | 4¶ | — | — | — | — | — |
| 39° 03′ 00″ S., 16° 11′ 45″ E. | | | | | | | | | | |
| **St. 449**, 11–12. x. 30 | N 100 B | 150–0 | — | — | 7¶ | — | — | — | — | — |
| 42° 30′ 30″ S., 15° 14′ 15″ E. | | | | | | | | | | |

## Table *e* (*cont.*)

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Typhloscolex mülleri | Travisiopsis levinseni | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|---|---|
| **St. 450**, 12–13. x. 30<br>44° 57′ 45″ S., 12° 57′ 15″ E. to<br>44° 56′ 30″ S., 12° 54′ 00″ E. | N 100 B | 150–0 | — | — | 25¶ | — | — | — | — | — |
| **St. 451**, 13–14. x. 30<br>47° 19′ 45″ S., 11° 05′ 00″ E. | N 100 B | 170–0 | — | 9** | — | — | — | — | — | — |
| **St. 452**, 14. x. 30<br>49° 50′ 00″ S., 08° 32′ 30″ E. | N 100 B | 91–0 | — | — | — | — | — | — | — | — |
| **St. 453**, 16–17. x. 30<br>54° 05′ 30″ S., 03° 57′ 15″ E. to<br>54° 07′ 00″ S., 04° 03′ 00″ E. | N 100 B | 165–0 | — | — | 20¶ | — | — | — | — | — |
| **St. 454**, 17. x. 30<br>53° 42′ 00″ S., 04° 42′ 00″ E. | N 100 B | 192–0 | — | — | 4¶ | — | — | — | — | — |
| **St. 455**, 18. x. 30<br>53° 55′ 30″ S., 04° 47′ 00″ E. | N 100 B | 116–0 | — | — | 3¶ | — | — | — | — | — |
| **St. 459**, 19. x. 30<br>55° 09′ 15″ S., 02° 00′ 00″ E. | N 100 B | 183–0 | — | — | 5¶ | — | — | — | — | — |
| **St. 460**, 20–21. x. 30<br>56° 46′ 00″ S., 00° 41′ 45″ W. | N 100 B | 155–0 | — | — | 8¶ | — | — | — | — | — |
| **St. 461 C**, 21–22. x. 30<br>56° 44′ 00″ S., 02° 22′ 00″ W. | N 100 B | **95–0** | 1 | — | 1 | 1 | — | — | — | — |
| **St. 463**, 24. x. 30<br>55° 42′ 00″ S., 10° 54′ 00″ W. | N 100 B | 132–0 | — | — | — | — | — | — | — | — |
| **St. 464**, 26. x. 30<br>56° 03′ 00″ S., 12° 18′ 00″ W. | N 100 H | 67(–0) | — | — | — | — | — | — | — | — |
| **St. 465**, 26. x. 30<br>55° 49′ 00″ S., 14° 02′ 15″ W. | N 100 B | 113–0 | — | — | — | — | — | — | — | — |
| **St. 466**, 27. x. 30<br>55° 35′ 00″ S., 16° 31′ 30″ W. | N 100 B | 79–0 | — | — | — | — | — | — | — | — |

* Monro, 1930. † Reported by Monro, 1930, as *Travisiopsis* sp. ‡ Reported by Monro, 1930 as *Sagitella kowalewskii*. § One specimen of *Vanadis violacea* from each of these nets, not now identifiable. ¶ Monro, 1936. ** Reported by Monro, 1936, as *Tomopteris cavallii*.

## Table *f*. *30° W. Line*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 661**, 2. iv. 31 | TYFB | **360–0** | 5 | — | 3 | — | — | — | — |
| 57° 36′ S., 29° 54′ 30″ W. to | TYFV | 500–250 | — | 1 | 5 | — | — | — | 1 |
| 57° 36′ S., 29° 35′ W. | TYFV | 750–500 | 2 | — | — | — | — | — | — |
| **St. 662**, 3. iv. 31 | TYFB | **460–0** | 1 | — | 4 | 1 | — | — | — |
| 55° 56′ S., 29° 57′ W. | | | | | | | | | |
| **St. 663**, 4. iv. 31 | TYFB | **380–0** | 4 | 3 | 5 | — | — | — | — |
| 53° 34′ 30″ S., 30° 25′ 45″ W. to | TYFV | 500–250 | — | — | — | — | — | — | 1 |
| 53° 32′ 15″ S., 30° 20′ W. | TYFV | 1500–1000 | — | — | — | — | — | — | — |
| **St. 665**, 17. iv. 31 | TYFB | **250–0** | 1 | — | 1 | — | — | — | — |
| 51° 41′ 30″ S., 29° 58′ 45″ W. | | | | | | | | | |
| **St. 666**, 17–18. iv. 31 | TYFB | **320–0** | 1 | 1 | 5 | — | — | — | — |
| 49° 58′ 45″ S., 29° 52′ 30″ W. to | TYFV | 750–500 | 1 | — | — | — | — | — | 1 |
| 49° 58′ 45″ S., 30° 13′ W. | TYFV | 1000–750 | — | 1 | 1 | — | — | 1 | 2 |
| | TYFV | 3000–2000 | — | — | — | — | — | — | 1 |
| **St. 668**, 19. iv. 31 | TYFB | **375–0** | — | — | — | — | — | — | 1 |
| 46° 42′ 30″ S., 30° 22′ W. to | TYFV | 500–250 | — | — | — | — | — | — | 1 |
| 46° 43′ 30″ S., 30° 22′ W. | TYFV | **1500–1000** | — | — | — | — | — | — | 2 |
| **St. 669**, 21. iv. 31 | TYFV | 2000–0 | — | — | — | — | — | — | 3 |
| 47° 04′ S., 30° 17′ W. | | | | | | | | | |

Table *f* (*cont.*)

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Typhloscolex mülleri | Travisiopsis levinseni |
|---|---|---|---|---|---|---|---|---|---|
| **St. 671**, 22–23. iv. 31 | TYFB | **360–0** | — | — | 1 | — | — | — | — |
| 43° 08′ S., 30° 15′ 45″ W. | TYFV | 1000–0 | — | 5 | — | — | — | — | 1 |
| | TYFV | 1000–750 | — | — | — | — | — | — | 1 |
| | TYFV | **1500–1000** | — | — | — | — | — | — | 1 |
| | TYFV | **2000–1500** | — | — | — | — | — | — | 3 |
| **St. 672**, 23. iv. 31 | TYFB | 200–0 | — | 2 | — | — | — | — | — |
| 40° 25′ S., 30° 06′ W. | | | | | | | | | |
| **St. 673**, 24–25. iv. 31 | TYFB | 340–0 | — | — | — | — | — | — | — |
| 38° 10′ 30″ S., 30° 10′ 15″ W. to | TYFV | 250–0 | — | — | 2 | — | — | — | — |
| 38° 03′ 45″ S., 29° 48′ W. | TYFV | **500–250** | — | 1 | — | — | — | — | — |
| | TYFV | **1000–750** | — | — | — | — | — | — | — |
| | TYFV | **2000–1500** | — | — | — | — | — | — | — |
| **St. 674**, 25. iv. 31 | TYFB | **280–0** | — | 2 | — | — | — | — | — |
| 35° 58′ 30″ S., 29° 56′ W. | | | | | | | | | |
| **St. 675**, 26. iv. 31 | TYFV | 250–0 | — | — | — | — | — | — | — |
| 34° 08′ S., 29° 50′ 30″ W. | TYFV | 1000–750 | — | — | — | — | — | — | 1 |
| **St. 676**, 26. iv. 31 | TYFB | **290–0** | — | — | — | — | — | — | — |
| 33° 43′ 45″ S., 29° 52′ 45″ W. | | | | | | | | | |
| **St. 677**, 27–28. iv. 31 | TYFB | **420–0** | — | — | — | — | — | — | — |
| 31° 16′ 15″ S., 29° 56′ 30″ W. | TYFV | 250–0 | — | — | — | — | — | — | — |
| | TYFV | 750–500 | — | — | — | — | — | — | — |
| | TYFV | **2000–0** | — | 2 | — | — | — | — | — |
| **St. 678**, 28. iv. 31 | TYFB | **360–0** | — | — | — | — | — | — | — |
| 28° 30′ S., 29° 58′ W. | | | | | | | | | |
| **St. 679**, 29. iv. 31 | TYFB | **300–0** | — | — | — | — | — | — | — |
| 26° 06′ 30″ S., 30° 06′ 15″ W. | TYFV | 250–0 | — | — | — | — | — | — | — |
| | TYFV | **1500–1000** | — | — | — | — | — | — | — |
| **St. 680**, 3. iv. 31 | TYFB | **260–0** | — | 1 | — | — | 1 | — | — |
| 22° 36′ S., 30° 01′ 30″ W. | | | | | | | | | |
| **St. 682**, 1. v. 31 | TYFB | **375–0** | — | — | — | — | — | — | — |
| 20° 11′ S., 29° 57′ 15″ W. | | | | | | | | | |
| **St. 683**, 2. v. 31 | TYFB | **290–0** | — | — | — | — | — | — | — |
| 16° 48′ S., 29° 54′ 45″ W. | | | | | | | | | |
| **St. 685**, 3. v. 31 | TYFB | **350–0** | — | — | — | — | 2 | — | — |
| 14° 28′ 45″ S., 29° 48′ 45″ W. | | | | | | | | | |
| **St. 686**, 4. v. 31 | TYFB | **400–0** | — | 1 | — | — | — | — | — |
| 11° 02′ 30″ S., 29° 51′ W. | | | | | | | | | |
| **St. 687**, 5. v. 31 | TYFV | 500–250 | — | — | — | — | — | — | — |
| 09° 47′ S., 29° 51′ W. | TYFV | 750–500 | — | — | — | — | — | — | — |
| **St. 688**, 5. v. 31 | TYFB | **450–0** | — | — | — | — | — | — | — |
| 09° 26′ 30″ S., 29° 50′ 30″ W. | | | | | | | | | |
| **St. 689**, 6. v. 31 | TYFB | **410–0** | — | — | — | — | — | — | — |
| 05° 59′ 45″ S., 29° 49′ 30″ W. | | | | | | | | | |
| **St. 690**, 7–8. v. 31 | TYFB | **460–0** | — | — | — | — | — | — | — |
| 03° 17′ 45″ S., 29° 57′ 45″ W. to | TYFV | **1500–0** | — | — | — | — | — | — | — |
| 03° 20′ S., 30° 03′ 15″ W. | | | | | | | | | |
| **St. 692**, 9. v. 31 | TYFB | **350–0** | — | — | 2 | — | — | — | — |
| 02° 02′ 15″ N., 30° 08′ W. | | | | | | | | | |
| **St. 693**, 10. v. 31 | TYFV | 250–0 | — | — | — | — | — | — | — |
| 02° 59′ 30″ N., 29° 59′ W. to | TYFV | 500–250 | — | — | — | — | — | — | — |
| 02° 59′ 30″ N., 30° 04′ 45″ W. | | | | | | | | | |
| **St. 694**, 10. v. 31 | TYFB | **210–0** | — | — | — | — | — | — | — |
| 04° 05′ 30″ N., 30° 00′ W. | | | | | | | | | |
| **St. 697**, 12. v. 31 | TYFB | **460–0** | — | — | 6 | — | — | — | — |
| 09° 15′ 15″ N., 30° 01′ 45″ W. | | | | | | | | | |
| **St. 698**, 13. v. 31 | TYFB | **470–0** | — | — | 2 | — | — | — | — |
| 12° 21′ 45″ N., 30° 07′ 30″ W. | | | | | | | | | |
| **St. 699**, 14. v. 31 | TYFB | **370–0** | — | — | 1 | — | — | — | — |
| 14° 27′ 15″ N., 30° 02′ 15″ W. | TYFV | 500–250 | — | — | — | — | — | — | — |
| | TYFV | 750–500 | — | — | — | — | — | — | — |

## Table *g*. *Falkland Islands to Cape Town*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris planktonis | Tomopteris septentrionalis | Travisiopsis levinseni | Typhloscolex mülleri | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|
| **St. 69**, 25. v. 26 | N 70 H | **45**(–0) | — | 7 | — | — | — |
| 45° 06′ 00″ S., 49° 00′ 00″ W. | | | | | | | |
| **St. 71**, 30. v. 26 | TYF | 2000–0 | — | — | — | — | — |
| 43° 20′ 00″ S., 46° 02′ 00″ W. | N 70 V | 500–250 | — | — | — | 2 | — |
| | N 70 V | 750–500 | — | — | — | 2 | — |
| | N 70 V | 1000–750 | — | — | 1 | 1 | — |
| **St. 72**, 1. vi. 26 | N 70 V | 500–250 | — | — | 1 | — | — |
| 41° 43′ 20″ S., 42° 20′ 40″ W. | | | | | | | |
| **St. 74**, 3. vi. 26 | N 70 V | 1000–0 | — | — | — | — | — |
| 40° 30′ 40″ S., 38° 14′ 50″ W. | | | | | | | |
| **St. 78**, 12. vi. 26 | TYF | 1000(–0) | — | — | 1 | — | — |
| 35° 18′ 00″ S., 19° 01′ 10″ W. | | | | | | | |
| **St. 85**, 23. vi. 26 | N 450 | **2000**(–0) | — | — | 1 | — | — |
| 33° 07′ 40″ S., 4° 30′ 20″ E. | N 70 V | 1000–750 | — | — | — | 1 | 1 |
| **St. 87**, 25. vi. 26 | TYF | 1000–0 | — | — | — | — | — |
| 33° 53′ 45″ S., 9° 26′ 30″ E. | N 70 V | 1000–0 | — | — | — | — | 2 |
| **St. 89**, 28. vi. 26 | TYF | 1000(–0) | — | — | 1 | — | — |
| 34° 05′ 15″ S., 16° 00′ 45″ E. | N 70 V | 100–50 | — | — | — | — | 1 |
| | N 70 V | 250–100 | — | — | — | — | 2 |
| | N 70 V | 750–500(–0) | — | — | — | 1 | 2 |
| **St. 247**, 16. vi. 27 | TYF | **115–100** | 2 | — | — | — | — |
| 37° 20′ 00″ S., 12° 47′ 30″ W. | | | | | | | |
| **St. 250**, 17. vi. 27 | TYF | **300**(–0) | 13 | 3 | — | — | — |
| 36° 09′ 00″ S., 5° 33′ 00″ W. | | | | | | | |
| **St. 254**, 21. vi. 27 | TYF | **200–0** | 39 | 1 | — | — | — |
| 35° 04′ 00″ S., 2° 59′ 30″ E. | | | | | | | |
| **St. 256**, 23. vi. 27 | TYF | 1100–850(–0) | 2 | — | 3 | — | — |
| 35° 14′ 00″ S., 6° 49′ 00″ E. | | | | | | | |
| **St. 257**, 24. vi. 27 | TYF | **250**(–0) | 20 | 13 | — | — | — |
| 35° 01′ 00″ S., 10° 18′ 00″ E. | | | | | | | |
| **St. 258**, 25. vi. 27 | TYF | **450–320** | — | — | — | — | — |
| 35° 03′ 30″ S., 13° 55′ 00″ E. | | | | | | | |
| **St. 259**, 26. vi. 27 | TYF | **450–370** | 1 | — | — | — | — |
| 34° 59′ 00″ S., 16° 39′ 00″ E. | | | | | | | |

Table *h*. *Cape Verde Islands to and from Cape Town*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis longissima | Travisiopsis levinseni | Typhloscolex mülleri | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|
| **St. 266**, 21. vii. 27 | TYF | **200–0** | — | 11 | — | — | — | — |
| 29° 34′ 00″ S., 12° 24′ 00″ E. | | | | | | | | |
| **St. 267**, 23. vii. 27 | TYF | **550–450(–0)** | 113 | 113 | — | — | — | 1 |
| 24° 31′ 00″ S., 12° 15′ 30″ E. | | | | | | | | |
| **St. 268**, 25. vii. 27 | TYF | **150–100(–0)** | — | 73 | — | — | — | 1 |
| 18° 37′ 00″ S., 10° 46′ 00″ E. | N 100 B | 73–0 | — | 10 | — | — | — | — |
| **St. 270**, 27. vii. 27 | TYF | **200–0** | — | — | 1 | — | — | — |
| 13° 58′ 30″ S., 11° 43′ 30″ E. | | | | | | | | |
| **St. 273**, 31. vii. 27 | TYF | **230–200(–0)** | — | — | — | — | — | — |
| 9° 38′ 00″ S., 12° 42′ 30″ E. | | | | | | | | |
| **St. 276**, 5. viii. 27 | TYF | **150(–0)** | — | — | — | — | — | — |
| 5° 54′ 00″ S., 11° 19′ 00″ E. | | | | | | | | |
| **St. 282**, 12. viii. 27 | TYF | **300(–0)** | — | 3 | 1 | — | — | — |
| 1° 11′ 00″ S., 5° 38′ 00″ E. | | | | | | | | |
| **St. 287**, 19. viii. 27 | TYF | **1000–800(–0)** | — | — | 1 | — | — | — |
| 2° 49′ 30″ S., 9° 25′ 30″ W. | | | | | | | | |
| **St. 288**, 21. viii. 27 | TYF | **250(–0)** | — | — | — | — | — | — |
| 00° 56′ 00″ S., 14° 08′ 30″ W. | | | | | | | | |
| **St. 289**, 23–24. viii. 27 | TYF | **225–125(–0)** | — | — | — | — | — | — |
| 3° 04′ 45″ N., 16° 52′ 00″ W. | | | | | | | | |
| **St. 291**, 24. viii. 27 | TYF | **100(–0)** | — | — | 1 | — | — | — |
| 3° 46′ 00″ N., 16° 49′ 00″ W. | | | | | | | | |
| **St. 294**, 25. viii. 27 | TYF | **115–100(–0)** | — | — | — | — | — | — |
| 4° 33′ 15″ N., 16° 52′ 45″ W. | | | | | | | | |
| **St. 1592**, 17. x. 35 | TYFB | **200–0** | — | — | 1 | — | — | — |
| 09° 31·4′ N., 18° 05·2′ W. | TYFB | **700–450** | — | — | — | — | — | — |
| **St. 1594**, 19. x. 35 | TYFB | **144–0** | — | 2 | — | — | — | — |
| 04° 15·9′ N., 12° 58·2′ W. | TYFB | **490–300** | — | — | — | — | — | — |
| **St. 1596**, 21. x. 35 | TYFB | **170–0** | 2 | 2 | — | — | — | — |
| 01° 40·3′ S., 07° 46·9′ W. | TYFB | **450–310** | — | — | — | — | — | — |
| **St. 1598**, 23. x. 35 | TYFB | **180–0** | — | 1 | 3 | — | — | — |
| 07° 10·8′ S., 02° 06·9′ W. | TYFB | **460–300** | — | 1 | — | — | — | — |
| **St. 1600**, 25. x. 35 | TYFB | **151–0** | — | 12 | — | — | — | — |
| 12° 43·3′ S., 00° 20·2′ E. | TYFB | **400–330** | — | 3 | — | — | — | — |
| **St. 1602**, 27. x. 35 | TYFB | **175–0** | — | — | — | — | — | — |
| 17° 59·9′ S., 04° 27·1′ E. | TYFB | **470–300** | — | — | — | — | — | — |
| **St. 1604**, 29. x. 35 | TYFB | **182–0** | 1 | — | — | — | — | — |
| 21° 34·4′ S., 08° 09·8′ E. | TYFB | **620–500** | — | 1 | — | — | — | — |
| **St. 1606**, 31. x. 35 | TYFB | **190–0** | 1 | 9 | — | — | — | — |
| 26° 15·8′ S., 12° 18′ E. | TYFB | **600–500** | — | — | — | — | — | — |
| **St. 2028**, 3. iv. 37 | N 100 H | **5–0** | — | — | — | — | — | — |
| 33° 57′ S., 03° 02·4′ E. | N 70 B | **118–0** | 1 | — | — | — | — | — |
| | N 100 B | **118–0** | 2 | — | — | — | — | — |
| **St. 2029**, 3. iv. 37 | TYFB | 2900–2600 | — | 1 | — | — | — | — |
| 33° 57′ S., 03° 02·4′ E. | | | | | | | | |
| **St. 2030**, 4. iv. 37 | N 100 H | **0–5** | — | — | — | — | — | — |
| 33° 58·1′ S., 06° 47′ E. | N 70 B | **168–0** | — | — | — | — | — | — |
| | N 100 B | **168–0** | — | — | — | — | — | — |
| **St. 2031**, 5. iv. 37 | TYFB | 1800–1550 | — | — | — | 1 | — | — |
| 33° 57·2′ S., 09° 22·2′ E. | | | | | | | | |
| **St. 2032**, 5. iv. 37 | N 100 H | **0–5** | — | — | — | — | — | — |
| 33° 57·5′ S., 10° 24·1′ E. to | N 70 B | **111–0** | — | — | — | — | — | — |
| 33° 59·6′ S., 10° 24·6′ E. | N 100 B | **111–0** | — | — | — | — | — | — |
| **St. 2033**, 6. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 33° 54′ S., 12° 31·2′ E. | TYFB | 1350–1250 | — | — | — | 1 | — | — |

Table *h* (*cont.*)

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis longissima | Travisiopsis levinseni | Typhloscolex mülleri | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|
| **St. 2034**, 6. iv. 37 | N 100 H | **0–5** | — | — | — | — | — | — |
| 33° 46·6′ S., 14° 01·6′ E. | N 70 B | **162–0** | 1 | — | — | — | — | — |
| | N 100 B | **162–0** | 3 | — | — | — | — | — |
| **St. 2035**, 7. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 33° 57·2′ S., 16° 12·2′ E. | TYFB | 950–750 | — | — | — | — | — | — |
| **St. 2036**, 17. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 33° 45·5′ S., 15° 03·8′ E. | TYFB | 2650–2200 | — | — | — | — | — | — |
| **St. 2037**, 18. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 33° 29·4′ S., 10° 43′ E. | TYFB | 2050–1800 | — | — | — | — | — | — |
| **St. 2038**, 19. iv. 37 | TYFB | 1200–850 | — | — | — | — | — | — |
| 33° 29·2′ S., 06° 37·9′ E. | | | | | | | | |
| **St. 2039**, 20. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 33° 38·5′ S., 3° 58·5′ E. | TYFB | 1500–1200 | — | — | — | — | — | — |
| **St. 2040**, 21. iv. 37 | TYFB | 600–0 | 1 | — | — | — | — | — |
| 33° 54·1′ S., 00° 08·8′ E. | | | | | | | | |
| **St. 2042**, 22. iv. 37 | TYFB | 2800–2300 | — | — | — | — | — | — |
| 31° 40·5′ S., 00° 28·4′ W. | | | | | | | | |
| **St. 2044**, 23. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 28° 38′ S., 01° 11·2′ W. | N 450 H | 550–750 | — | — | — | — | — | — |
| | N 450 B | 750–0 | — | — | — | — | — | — |
| **St. 2045**, 23. iv. 37 | N 100 H | **0–5** | — | — | — | — | — | — |
| 27° 27·1′ S., 01° 18·6′ W. | | | | | | | | |
| **St. 2046**, 24. iv. 37 | N 450 B | 500–0 | — | — | — | — | — | — |
| 26° 06·9′ S., 01° 33·6′ W. | | | | | | | | |
| **St. 2047**, 24. iv. 37 | N 100 H | 0–5 | — | — | — | — | — | — |
| 24° 53·9′ S., 01° 43·5′ W. | TYFB | 1300–900 | — | — | — | — | — | — |
| **St. 2048**, 25. iv. 37 | N 450 B | 1400–600 | — | — | — | — | — | — |
| 23° 16′ S., 01° 51·7′ W. | N 450 B | 600–0 | — | — | — | — | — | — |
| **St. 2050**, 26. iv. 37 | N 450 B | 430–0 | — | — | — | — | — | — |
| 20° 26′ S., 02° 16′ W. | | | | | | | | |
| **St. 2051**, 26. iv. 37 | TYFB | 990–600 | — | — | — | — | — | — |
| 19° 10′ S., 02° 30·9′ W. | | | | | | | | |
| **St. 2053**, 27. iv. 37 | N 450 B | 500–0 | — | — | — | — | — | — |
| 17° 45·7′ S., 02° 49·8′ W. | TYFB | 900–550 | — | — | — | — | — | — |
| **St. 2055**, 28. iv. 37 | TYFB | 2000–1400 | — | — | — | — | — | — |
| 14° 55·8′ S., 03° 39·7′ W. | | | | | | | | |
| **St. 2057**, 29. iv. 37 | N 450 B | 1450–700 | — | — | — | — | — | — |
| 12° 09′ S., 04° 28·2′ W. | N 450 B | 700–0 | — | — | — | — | — | — |
| **St. 2059**, 30. iv. 37 | N 450 B | 1900–1400 | — | — | — | — | — | — |
| 09° 11·4′ S., 05° 17·4′ W. | N 450 B | 1400–0 | — | — | — | — | — | — |
| **St. 2061**, 1. v. 37 | N 450 B | 1900–1500 | — | — | — | — | — | — |
| 06° 36′ S., 06° 25·1′ W. | N 450 B | 1500–0 | — | — | — | — | — | — |
| **St. 2063**, 2. v. 37 | N 450 B | 1150–600 | — | — | — | — | — | — |
| 03° 24·8′ S., 07° 51·2′ W. | N 450 B | 600–0 | — | — | — | — | — | — |
| **St. 2064**, 3. v. 37 | N 450 B | 1600–1050 | — | — | — | — | — | — |
| 00° 46·9′ S., 10° 11·5′ W. | N 450 B | 1050–0 | — | — | — | — | — | — |
| **St. 2065**, 4. v. 37 | N 450 B | 1600–1400 | — | — | — | — | — | — |
| 02° 07·9′ N., 12° 30·5′ W. | N 450 B | 1400–0 | — | — | — | — | — | — |
| **St. 2066**, 5. v. 37 | N 450 B | 1950–1550 | — | — | — | — | — | — |
| 04° 56·4′ N., 14° 46·7′ W. | N 450 B | 1550–0 | — | — | — | — | — | — |
| **St. 2073**, 20. x. 37 | TYFB | **375–0** | 1 | 1 | — | — | — | — |
| 13° 12·2′ N., 23° 44′ W. | | | | | | | | |
| **St. 2074**, 21. x. 37 | TYFB | **875–400** | — | — | — | — | — | — |
| 10° 10·9′ N., 21° 13·6′ W. | | | | | | | | |
| **St. 2075**, 22. x. 37 | TYFB | **1200–950** | — | — | — | — | — | — |
| 07° 30·6′ N., 19° 03·3′ W. | | | | | | | | |

Table *h* (*cont.*)

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis longissima | Travisiopsis levinseni | Typhloscolex mülleri | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|
| **St. 2076**, 24. x. 37 03° 05·4′ N., 15° 14·5′ W. | TYFB | 1400–1050 | — | — | — | — | — | — |
| **St. 2077**, 25. x. 37 00° 04·2′ S., 12° 22·1′ W. | TYFB | 1300–1000 | — | — | — | — | — | — |
| **St. 2078**, 26. x. 37 01° 53·2′ S., 10° 53·8′ W. | TYFB | 2600–1400 | — | 1 | — | — | — | — |
| **St. 2079**, 27. x. 37 | TYFB | **250–0** | 1 | — | — | — | — | — |
| 05° 51′ S., 07° 44·3′ W. | TYFB | **550–250** | — | — | — | — | — | — |
| **St. 2080**, 29. x. 37 | TYFB | 400–0 | — | 1 | — | — | — | — |
| 10° 12·7′ S., 04° 02′ W. | TYFB | 1750–950 | — | — | — | — | — | — |
| **St. 2081**, 31. x. 37 15° 25·2′ S., 00° 28·9′ E. | TYFB | 950–500 | — | — | — | — | — | — |
| **St. 2082**, 2. xi. 37 | TYFB | 330–0 | — | — | 1 | — | — | — |
| 20° 53·4′ S., 05° 23·6′ E. | TYFB | 1100–800 | — | — | — | — | — | — |
| **St. 2083**, 3. xi. 37 24° 43·9′ S., 08° 58·7′ E. | TYFB | **330–0** | 1 | 4 | — | — | — | — |
| **St. 2084**, 5. xi. 37 | TYFB | 240–0 | 1 | — | — | — | — | — |
| 28° 52·9′ S., 13° 20·4′ E. | TYFB | 1500–800 | — | 5 | — | — | — | — |
| **St. 2627**, 29. iii. 39 33° 11·5′ S., 17° 14·7′ E. | TYFB | **310–40** | — | — | — | — | — | — |
| **St. 2628**, 30. iii. 39 30° 54·1′ S., 13° 14·1′ E. | TYFB | **1300–650** | — | — | — | — | — | — |
| **St. 2629**, 31. iii. 39 27° 17·1′ S., 12° 04′ E. | TYFB | **1800–1300** | — | 1 | — | — | — | — |
| **St. 2630**, 1. iv. 39 23° 39·2′ S., 10° 53·6′ E. | TYFB | **1050–550** | — | 8 | — | — | — | — |
| **St. 2632**, 3. iv. 39 15° 56·3′ S., 10° 49′ E. | TYFB | **1800–?** | — | — | — | — | — | — |
| **St. 2635**, 11. iv. 39 10° 19′ S., 09° 36·4′ E. | TYFB | **280–0** | — | — | 1 | — | — | — |
| **St. 2636**, 12. iv. 39 08° 26·5′ S., 05° 59·4′ E. | TYFB | **950–550** | — | — | 1 | — | — | — |
| **St. 2638**, 14. iv. 39 04° 50·3′ S., 00° 47·3′ W. | TYFB | **150–0** | — | 1 | — | — | — | — |
| **St. 2639**, 15. iv. 39 02° 53·2′ S., 04° 21·5′ W. | TYFB | **1200–600** | — | — | — | — | — | — |
| **St. 2640**, 16. iv. 39 01° 47′ S., 06° 13′ W. | N 50 V | 100–0 | — | 1 | — | — | 1 | 1 |
| **St. 2641**, 16–17. iv. 39 00° 45·3′ S., 07° 26·6′ W. | N 50 V | **100–0** | 2 | 1 | — | — | 2 | 3 |
| **St. 2642**, 17. iv. 39 00° 18·7′ N., 08° 39·4′ W. | N 50 V | 100–0 | — | — | — | — | — | — |
| **St. 2643**, 18. iv. 39 01° 27·4′ N., 09° 53·5′ W. | N 50 V | **100–0** | — | — | — | — | 1 | 1 |
| **St. 2644**, 18. iv. 39 02° 35·8′ N., 10° 58·5′ W. | N 50 V | 100–0 | — | — | — | — | — | — |
| **St. 2645**, 19. iv. 39 03° 39·2′ N., 12° 09·6′ W. | N 50 V | **100–0** | — | — | — | — | — | — |
| **St. 2646**, 19. iv. 39 | TYFB | **250–0** | — | 3 | — | — | — | — |
| 05° 38·7′ N., 14° 03·1′ W. | TYFB | **1500–800** | — | — | — | — | — | 2 |
| **St. 2647**, 20. iv. 39 07° 58′ N., 16° 36·3′ W. | TYFB | **310–0** | — | 3 | — | — | — | — |
| **St. 2648**, 21. iv. 39 | TYFB | **500–0** | — | — | — | — | — | — |
| 10° 29·8′ N., 18° 46·1′ W. | TYFB | **1450–950** | — | — | — | — | — | 2 |

## Table *j*. *Cape Verde Islands to Falkland Islands*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris planktonis | Tomopteris septentrionalis | Travisiopsis levinseni |
|---|---|---|---|---|---|
| **St. 701**, 16. x. 31<br>14° 39·3′ N., 25° 51·7′ W. | TYFB | **242–0*** | — | — | — |
| **St. 702**, 17. x. 31<br>10° 59·3′ N., 27° 03·8′ W. | TYFB | **236–0*** | — | 1 | — |
| **St. 703**, 18. x. 31<br>07° 17′ N., 28° 01·9′ W. | TYFB | **358–0** | — | — | — |
| **St. 704**, 19. x. 31<br>03° 37·7′ N., 29° 14′ W. | TYFB | **231–0*** | — | — | — |
| **St. 705**, 20. x. 31<br>00° 03·4′ N., 30° 36·8′ W. | TYFB | **150–0*** | — | — | — |
| **St. 706**, 21. x. 31<br>03° 26·2′ S., 32° 08·3′ W. | TYFB | **354–0*** | — | — | — |
| **St. 707**, 22. x. 31<br>06° 44′ S., 33° 33′ W. | TYFB | **182–0*** | 4† | 2† | — |
| **St. 708**, 23. x. 31<br>10° 20·6′ S., 34° 54·7′ W. | TYFB | **208–0*** | — | — | — |
| **St. 709**, 24. x. 31<br>14° 01·4′ S., 36° 30·7′ W. | TYFB | **216–0*** | — | — | — |
| **St. 710**, 26. x. 31<br>21° 45′ S., 39° 50′ W. | TYFB | **294–0** | 1† | — | — |
| **St. 711**, 27. x. 31<br>24° 40·7′ S., 41° 30·8′ W. | TYFB | **290–0*** | — | — | — |
| **St. 712**, 28. x. 31<br>28° 02·1′ S., 43° 09·5′ W. | TYFB | **224–0*** | — | — | — |
| **St. 713**, 29. x. 31<br>31° 37·1′ S., 45° 00′ W. | TYFB | **200–0*** | — | — | — |
| **St. 714**, 30. x. 31<br>35° 09·5′ S., 47° 00′ W. | TYFB | **246–0*** | 1† | 4† | — |
| **St. 715**, 31. x. 31<br>38° 44·2′ S., 49° 18·7′ W. | TYFB | **230–0*** | — | — | — |
| **St. 716**, 1. xi. 31<br>42° 08·8′ S., 51° 35′ W. | TYFB | **212–0** | — | 2† | 1 |
| **St. 717**, 2. xi. 31<br>44° 42′ S., 53° 32·2′ W. | TYFB | **212–0** | — | — | — |
| **St. 718**, 3. xi. 31<br>47° 27·2′ S., 55° 10·2′ W. | TYFB | **262–0** | — | 12† | — |

* Numerous polychaetes which I have not seen are reported on the Analyses Sheets from these stations.
† Reported by Monro, 1936, as *Tomopteris planktonis*.

## Table *k*. *Miscellaneous Stations*

| *Station no., date and position* | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Rhynchonerella bongraini | Typhloscolex mülleri | Travisiopsis levinseni | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **St. 4**, 30. i. 26<br>36° 55′ 00″ S., 12° 12′ 00″ W. | N 100 H | 10–0* | — | — | — | — | — | — | — | — | — |
| **St. 12**, 18. ii. 26<br>51° 55′ 00″ S., 32° 27′ 30″ W. | N 70 V | 500–250* | — | — | — | — | — | 1 | — | — | 2 |
| **St. 17**, 4. iii. 26<br>46 miles N. 46° E. of Jason Light, South Georgia | N 70 V | 500–250* | — | — | — | — | — | — | — | 1 | 6† |
| **St. 26**, 14. iii. 26<br>26·5 miles N. 54° E. of Jason Light, South Georgia | N 100 H | 60(–0) | 1 | — | — | — | — | — | — | — | — |

Table *k* (*cont.*)

| *Station no., date and position* | | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Rhynchonerella bongraini | Typhloscolex mülleri | Travisiopsis levinseni | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **St. 41**, 28. iii. 26 | *A* | N 70 V | 265–150* | — | 1** | — | — | — | — | — | — | 3‡ |
| 16·5 miles N. 39° E. of | *B* | N 70 V | 265–150* | — | — | — | — | — | — | — | — | 6‡ |
| Barff Point | *D* | N 70 V | **240–150*** | — | — | — | — | — | — | — | — | 5‡ |
| South Georgia | *E* | N 70 V | **150–100*** | — | — | — | — | — | — | — | — | 4‡ |
| **St. 45**, 6. iv. 26 | | NCS-T | 270–238 | — | — | — | — | — | — | — | — | — |
| 2·7 miles S. 85° E. of Jason Light, South Georgia | | | | | | | | | | | | |
| **St. 130**, 20. xii. 26 | | N 70 H | 5–0* | 3 | — | 1† | — | — | — | — | — | — |
| 54° 06′ 00″ S., 36° 23′ 00″ W. | | | | | | | | | | | | |
| **St. 150**, 15–16. i. 27 | | N 100 H | 5–0* | 38 | — | — | — | — | — | — | — | — |
| 53° 52′ 30″ S., 36° 00′ W. to 53° 31° S., 35° 24′ 30″ W. | | | | | | | | | | | | |
| **St. 151**, 16. i. 27 | | N 70 V | 1000–750 | — | — | — | — | — | — | — | 1§ | — |
| 53° 25′ 00″ S., 35° 15′ 00″ W. | | | | | | | | | | | | |
| **St. 169**, 22. ii. 27 | | TYF | 1100–1000 | — | — | — | — | — | — | — | — | — |
| 60° 48′ 50″ S., 51° 00′ 20″ W. | | | | | | | | | | | | |
| **St. 334**, 4. ii. 30 | | N 70 B | 110–0 | — | — | — | 1‡ | — | — | — | — | — |
| 53° 43′ S., 36° 51′ W. | | | | | | | | | | | | |
| **St. 373**, 19. iii. 30 | | TYFB | **275–0** | — | — | — | 1‡ | — | — | — | — | — |
| 58° 00′ S., 33° 44′ W. | | | | | | | | | | | | |
| **St. 395**, 13. v. 30 | | N 450 H | 1600–1500 | — | — | — | — | — | — | — | — | — |
| 48° 26¾′ S., 22° 10′ W. to 48° 26½′ S., 22° 06½′ W. | | | | | | | | | | | | |
| **St. 461**, 21–22. x. 30 | | | | | | | | | | | | |
| 56° 44′ S., 02° 23′ W. | *B* | N 100 B | ? | 1 | — | — | — | — | — | — | — | — |
| 56° 44′ S., 02° 22′ W. | *C* | N 100 B | 95–0* | — | — | — | 1‡ | — | — | — | — | — |
| **St. 527**, 11. xii. 30 | | N 450 H | **122(–0)** | — | — | — | 3‡ | — | — | — | — | — |
| 54° 09¼′ S., 34° 29½′ W. | | | | | | | | | | | | |
| **St. 532**, 15. xii. 30 | | N 100 B | 150–0 | 3 | — | — | — | — | — | — | — | — |
| 58° 29′ S., 37° 44′ W. | | | | | | | | | | | | |
| **St. 535**, 18. xii. 30 | | N 100 B | 155–0 | — | — | — | 1 | — | — | — | — | — |
| 60° 13¼′ S., 50° 51½′ W. | | | | | | | | | | | | |
| **St. 619**, 19. ii. 31 | | N 70 B | 114–0 | — | — | — | 1‡ | — | — | — | — | — |
| 59° 33′ S., 43° 07¼′ W. | | | | | | | | | | | | |
| **St. 813**, 16. i. 32 | | N 100 B | **135–0** | 1 | — | — | — | — | — | — | — | — |
| 64° 55·9′ S., 23° 13′ W. | | | | | | | | | | | | |
| **St. 825**, 28. i. 32 | | N 70 B | **117–0** | 1 | — | — | — | — | — | — | — | — |
| 56° 31·2′ S., 36° 00·5′ W. | | | | | | | | | | | | |
| **St. 1079**, 14. xii. 32 | | N 50 V | 100–0 | — | — | — | — | — | — | — | — | 7 |
| 54° 24′ S., 35° 54·5′ W. | | | | | | | | | | | | |
| **St. 1148**, 9. iii. 33 | | N 100 H | **5–0** | — | — | — | 1‡ | — | — | — | — | — |
| 63° 52′ S., 00° 54·9′ W. | | | | | | | | | | | | |
| **St. 1157**, 15. iii. 33 | | TYFB | 240–0 | 2 | — | — | — | — | — | — | — | — |
| 61° 51′ 5″ S., 14° 31′ 3″ E. | | | | | | | | | | | | |
| **St. 1201**, 27. xi. 33 | | N 100 B | 93–0 | 1 | — | — | — | — | — | — | — | — |
| 53° 19·9′ S., 37° 07·4′ W. | | | | | | | | | | | | |
| **St. 1554**, 28. iii. 35 | | TYFB | 1500–0* | — | — | — | — | — | — | — | 1 | — |
| 38° 02·9′ S., 18° 39·7′ E. | | | | | | | | | | | | |
| **St. 1555**, 29. iii. 35 | | TYFB | **1000–0*** | — | 2 | 1 | — | — | — | — | — | — |
| 39° 51·6′ S., 18° 41·8′ E. | | | | | | | | | | | | |
| **St. 1559**, 2. iv. 35 | | N 450 H | 500(–0)* | 12 | — | — | — | — | — | — | — | — |
| 50° 07·2′ S., 22° 16·8′ E. | | | | | | | | | | | | |
| **St. 1772**, 23. v. 36 | | N 70 B | **440–150*** | — | — | — | — | — | — | — | — | 3 |
| 36° 01·8′ S., 00° 04·3′ E. | | N 70 B | **750–450*** | — | 2 | — | — | — | — | — | — | — |
| **St. 1789**, 8. vi. 36 | | N 70 B | 120–0 | — | — | — | 1 | — | — | — | — | — |
| 57° 11·4′ S., 17° 12·6′ E. | | | | | | | | | | | | |
| **St. 1871**, 12. xi. 36 | | TYFB | 1450–1000 | 1 | — | — | — | — | — | — | — | — |
| 64° 04·4′ S., 52° 57·5′ W. | | | | | | | | | | | | |

Table *k* (*cont.*)

| *Station no., date and position* | | *Net* | *Depth (m.)* | Tomopteris carpenteri (*adult*) | Tomopteris planktonis | Tomopteris septentrionalis | Vanadis antarctica | Vanadis longissima | Rhynchonerella bongraini | Typhloscolex mülleri | Travisiopsis levinseni | Pelagobia longicirrata |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **St. 1876**, 14. xi. 36 | | TYFB | 1550–1100 | 1 | — | — | — | — | — | — | — | — |
| 58° 37·7′ S., 54° 54·4′ W. | | | | | | | | | | | | |
| **St. 1881**, 22. xi. 36 | | N 100 B | 173–0* | — | — | — | — | 1 | — | — | — | — |
| 45° 49·5′ S., 60° 01·8′ W. | | | | | | | | | | | | |
| **St. 1917**, 3. xii. 36 | | TYFB | 1400–1000 | 1 | — | — | — | — | — | — | — | — |
| 53° 48·7′ S., 46° 27·7′ W. | | | | | | | | | | | | |
| **St. 1935**, 11. xii. 36 | | | | | | | | | | | | |
| 53° 31·9′ S., 37° 22·4′ W. | *F* | N 100 H | 200 | — | — | — | — | — | — | — | 3 | — |
| 53° 32′ S., 37° 25·2′ W. | *H* | N 100 H | 170 | — | — | — | — | — | — | — | 2 | — |
| **St. 1936**, 15. xii. 36 | *H* | N 100 H | 109 | — | — | — | 1 | — | — | — | — | — |
| 52° 58·8′ S., 37° 59·8′ W. | | | | | | | | | | | | |
| **St. 1946**, 3. i. 37 | | TYFB | 1700–1300 | — | — | — | — | — | — | — | — | 1 |
| 59° 09·2′ S., 48° 26·6′ W. | | | | | | | | | | | | |
| **St. 1972**, 28. ii. 37 | | N 70 B | 139–0* | — | — | — | — | 1 | — | — | — | — |
| 52° 11′ S., 52° 33·7′ W. | | | | | | | | | | | | |
| **St. 1993**, 12. iii. 37 | | TYFB | 950–650 | — | — | — | — | — | — | — | — | — |
| 59° 37·7′ S., 27° 52·8′ W. | | | | | | | | | | | | |
| **St. 1994**, 12. iii. 37 | | N 100 B | **254–166(–0)** | 1 | — | — | — | — | — | — | — | — |
| 60° 35·6′ S., 26° 40·4′ W. | | | | | | | | | | | | |
| **St. 1995**, 13. iii. 37 | | TYFB | 1800–1300 | — | — | — | — | — | — | — | 1 | — |
| 61° 21·1′ S., 25° 49·2′ W. | | | | | | | | | | | | |
| **St. 2006**, 19. iii. 37 | | N 100 B | 131–0 | — | — | — | 1 | — | — | — | — | — |
| 66° 16·7′ S., 13° 23·3′ W. | | | | | | | | | | | | |
| **St. 2322**, 17–18. iv. 38 | | N 100 B | 5–0* | — | — | — | 1 | — | 1 | — | — | — |
| 65° 53′ S., 00° 24·4′ E. | | N 100 B | 106–0* | — | — | 1 | 3 | — | — | — | — | — |
| | | N 100 B | 670–420* | — | 1 | 1 | — | — | — | 1 | 1 | — |
| **St. 2567**, 30. i. 39 | | N 100 H | 5–0 | 13 | — | — | — | — | — | — | — | — |
| 58° 12′ S., 19° 46′ E. | | | | | | | | | | | | |
| **St. WS 53**, 11–12. i. 27 | *B* | N 100 H | **5–0** | 1‡ | — | — | — | — | — | — | — | — |
| 54° 03′ 30″ S., 38° 35′ W. | *L* | N 100 H | **5–0** | 1 | — | — | — | — | — | — | — | — |
| to | *M* | N 100 H | **5–0** | 1 | — | — | — | — | — | — | — | — |
| 53° 29′ 00″ S, 37° 13′ 45″ W. | *O* | N 100 H | **5–0** | 1 | — | — | — | — | — | — | — | — |
| | *P* | N 100 H | **5–0** | 7 | — | — | — | — | — | — | — | — |
| | *T* | N 100 H | **5–0** | 2 | — | — | — | — | — | — | — | — |
| | *U* | N 100 H | **5–0** | 2 | — | — | — | — | — | — | — | — |
| | *V* | N 100 H | **5–0** | 1 | — | — | — | — | — | — | — | — |
| **St. WS 59**, 17. i. 27 | | N 100 H | 113 | 2 | — | — | — | — | — | — | — | — |
| 52° 57′ S., 37° 06′ 30″ W. | | | | | | | | | | | | |
| **St. WS 60**, 17. i. 27 | | N 100 H | **146** | 2 | — | — | — | — | — | — | — | — |
| 52° 47′ S., 37° 06′ 30″ W. | | | | | | | | | | | | |
| **St. WS 61**, 18. i. 27 | | N 100 H | **5–0** | 1 | — | — | — | — | — | — | — | — |
| 53° 37′ 30″ S., 37° 06′ 30″ W. | | N 100 H | **132** | 3 | — | — | — | — | — | — | — | — |
| **St. WS 194**, 11–12. iii. 28 | | N 100 B | 88–0* | 1 | — | — | 1 | — | — | — | — | — |
| 53° 23′ S., 37° 10′ W. to | | | | | | | | | | | | |
| 53° 03′ S., 36′ 52′ W. | | | | | | | | | | | | |
| **St. WS 200**, 21. iv. 28 | | N 100 B | 93–0 | — | — | — | 3 | — | — | — | — | — |
| 59° 05′ S., 46° 32′ W. | | | | | | | | | | | | |
| **St. WS 351**, 11. i. 29 | | N 70 V | **1000–750** | — | — | — | — | — | — | 1 | — | — |
| 54° 21′ 30″ S., 34° 59′ W. | | | | | | | | | | | | |
| **St. WS 372**, 21. i. 29 | | N 100 B | 150–0 | 2 | — | — | — | — | — | — | — | — |
| 54° 08′ 30″ S., 35° 42′ W. | | | | | | | | | | | | |
| **St. WS 408**, 26. ii. 29 | | N 70 B | 112–0* | — | — | — | — | 1‖ | — | — | — | — |
| 53° 50′ S., 62° 10′ W. | | | | | | | | | | | | |
| **St. WS 411**, 14. iii. 29 | | N 70 B | 100–0* | — | — | — | — | 1‖ | — | — | — | — |
| 52° 08′ S., 52° 35′ W. | | | | | | | | | | | | |
| **St. WS 472**, 12. xi. 29 | | N 100 B | 125–0 | — | — | — | — | — | — | — | — | 3 |
| 59° 42½′ S., 58° 01′ W. | | | | | | | | | | | | |

* These samples were sorted. Other records in this table are for specimens picked out at random. † Monro, 1930. ‡ Monro, 1936. § Reported by Monro, 1936, as *Travisiopsis benhami*. ‖ Reported by Monro, 1936, as *Vanadis antarctica*. ** Reported by Munro, 1936, as *Tomopteris septentrionalis*.